

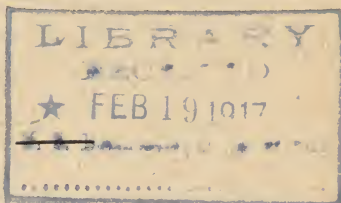
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5845  
U. S. DEPARTMENT OF AGRICULTURE.

LIST OF WORKERS IN  
SUBJECTS PERTAINING TO AGRICULTURE AND  
HOME ECONOMICS IN THE U. S. DEPART-  
MENT OF AGRICULTURE AND IN THE  
STATE AGRICULTURAL COLLEGES AND  
EXPERIMENT STATIONS.



CORRECTED TO JANUARY, 1917.



WASHINGTON:  
GOVERNMENT PRINTING OFFICE.  
1917.





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# List of Workers in Subjects Pertaining to Agriculture and Home Economics in the U. S. Department of Agriculture and in the State Agricultural Colleges and Experiment Stations.

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## UNITED STATES DEPARTMENT OF AGRICULTURE.

(Prepared in the Division of Publications,  
JOS. A. ARNOLD, *Editor and chief.*)

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### OFFICE OF THE SECRETARY.

**Secretary of Agriculture, DAVID F. HOUSTON.**

The Secretary of Agriculture is charged with the work of promoting agriculture in its broadest sense. He exercises general supervision and control over the affairs of the department and formulates and establishes the general policies to be pursued by its various branches and offices.

**Assistant Secretary of Agriculture, CARL VROOMAN.**

The Assistant Secretary of Agriculture becomes Acting Secretary in the absence of the Secretary and assists in the supervision and administration of the work of the department.

**Chief Clerk, ROBERT M. REESE.**

The Chief Clerk has general supervision of clerks and employees; of the order of business of the department and of records of the Secretary's office; and of expenditures from appropriations for miscellaneous expenses, rents, etc. He is responsible for the enforcement of the general regulations of the department and is custodian of buildings.

**Office of the Solicitor, FRANCIS G. CAFFEY, *Solicitor.***

The Solicitor is the legal adviser of the Secretary and the heads of the several branches of the department. He directs and supervises all law work of the department.

***Administrative and game laws section.* R. W. WILLIAMS, *Assistant to the Solicitor, in charge.***

This section attends to the administration of the general affairs of the office not specifically included in other sections; also prepares reports of violations, briefs, and memoranda, aids in drafting regulations, and assists in the trial of cases under the Lacey Act, migratory bird law, Alaska game law, and protection of bird reserves law.

***National forests laws section.* F. LEES, *Assistant to the Solicitor, in charge.***

This section does the law work arising from business of the Forest Service, including contests of claims to lands in the national forests under homestead, mineral, and other laws, cases arising out of timber, fire, fencing, and other trespasses on the national forests, opinions to the Forester and review of opinions presented to the district foresters by assistants to the Solicitor in the field, and various other legal matters connected with the national forests, such as drafting of contracts, regulations, and forms, correspondence with the Attorney General and Secretary of the Interior, and miscellaneous correspondence; prepares reports of violations, briefs, and memoranda, aids in drafting regulations, and assists in the trial of cases under the plant quarantine law; also handles legal questions and aids in drafting regulations, forms, and agreements under the Federal Aid Road Act.

***Meat inspection, animal quarantine laws, and contract section.* C. W. BOYLE, *Assistant to the Solicitor, in charge.***

This section prepares reports of violations, briefs, and memoranda, aids in drafting regulations, and assists in the trial of cases under the meat-inspection, animal quarantine, 28-hour, other animal transportation and virus laws, and drafts informations and indictments in the quarantine and virus cases; also draws bonds, contracts, leases, and other agreements, and prosecutes applications of department employees for patents.

*Food and drugs law section.* P. D. CRONIN, *Assistant to the Solicitor, in charge.*

In connection with the Federal Food and Drugs Act, this section prepares recommendations to United States attorneys for seizures, drafts informations and indictments in criminal cases, assists in the trial of important or technical cases, both civil and criminal, prepares notices of judgments, and aids in the conduct of public hearings and in drawing regulations, food-inspection decisions, and other rulings; also prepares reports of violations, briefs, and memoranda, aids in drafting regulations, and assists in the trial of cases under the Seed Importation Act.

*Insecticide and fungicide law section.* O. H. GATES, *Assistant to the Solicitor, in charge.*

In connection with the Federal Insecticide Act, this section prepares recommendations to United States attorneys for seizures, drafts information and indictments in criminal cases, assists in the trial of important or technical cases, both civil and criminal, prepares notices of judgments, and aids in drawing regulations, insecticide decisions, and other rulings; also compiles, and revises from time to time, the "Laws Applicable to the United States Department of Agriculture," and handles claims for balances due estates of deceased employees.

*Marketing and rural organization section.* E. B. QUIGGLE, *Assistant to the Solicitor, in charge.*

This section handles law work in connection with the United States cotton futures act, the United States grain standards act, and the United States warehouse act; advises the Office of Markets and Rural Organization regarding the legality of various types of cooperative organizations, and concerning legal problems relative to the marketing and distribution of farm products and rural credits; conducts general correspondence and compiles laws relating to these subjects; also handles miscellaneous legal questions.

*Acquisition of lands section.* A. H. McCONVILLE, *Assistant to the Solicitor, in charge.*

In connection with the acquisition of lands under the Weeks forestry law (act of Mar. 1, 1911), this section prepares agreements of purchase, supervises and directs the work of title attorneys engaged in the examination of titles, assists United States attorneys in the conduct of condemnation proceedings, and handles correspondence with the Attorney General.

*Assistants to the Solicitor, stationed in the field.*

Branches of the Office of the Solicitor are located at Missoula, Mont., in charge of D. F. McGowan, assisted by A. W. Herger; Denver, Colo., in charge of R. F. Feagans; Albuquerque, N. Mex., in charge of J. O. Seth; Ogden, Utah, in charge of J. F. Lawson; San Francisco, Cal., in charge of H. P. Dechant; and Portland, Oreg., in charge of W. F. Staley. These officers are legal advisers to the district foresters and handle the law work of the Forest Service in the field, besides such local legal work of the department as may be assigned by the Solicitor.

**Office of Farm Management.** W. J. SPILLMAN, *Chief*; E. H. THOMSON, *Assistant Chief*; LISLE MORRISON, *Assistant to the Chief.*

This office studies the details of farm practice. Its main object is to improve farm practice by introducing better business methods and by applying the principles of science wherever they are known. The types of farming prevailing in the various sections of the country are being studied in a number of localities, and a detailed study of farm economics and business principles is being made.

*Scientific staff.*—J. H. Arnold, O. E. Baker, C. M. Bennett, G. A. Billings, E. A. Boeger, D. A. Brodie, Julius S. Cates, Levi Chubbuck, R. W. Clothier, J. S. Cotton, M. A. Crosby, J. A. Drake, C. L. Goodrich, Byron Hunter, S. O. Jayne, J. M. Johnson, H. B. McClure, A. D. McNair, H. A. Miller, L. A. Moorhouse, A. G. Smith, Harry Thompson, Rex E. Willard, and E. O. Wooton, agriculturists; F. H. Branch, L. G. Connor, A. J. Dadisman, H. M. Dixon, L. W. Fluharty, Earl S. Haskell, C. E. Hoke, G. H. Miller, M. B. Oates, F. D. Stevens, and Arnold P. Yerkes, assistant agriculturists; H. H. Clark, W. C. Funk, H. W. Hawthorne, C. E. Hope, L. G. Howell, H. N. Humphrey, R. D. Jennings, Oscar A. Juve, Frank Montgomery, John C. Rundles, C. F. Sarle, Earl D. Strait, Thomas H. Summers, S. M. Thomson, H. R. Tolley, and H. A. Turner, scientific assistants; J. S. Ball, Lillian Church, M. O. Cooper, M. R. Cooper, H. G. Strait, and Raymond S. Washburn, assistants in farm-cost accounting; William G. Reed and George L. Schultze, assistants in agricultural geography; E. A. Goldenweiser, statistical expert; H. H. Mowry, assistant in dry-land agriculture; Oscar C. Stine, assistant in farm economics; Raymond Evans, editor in farm management; Francis Joseph Marschner, cartographer; F. W. Peck, agent.

**Office of Information.** G. W. WHARTON, *in charge.*

The Office of Information is established to secure the widest possible circulation in popular form for the discoveries and recommendations of the scientists, specialists, and

field workers of the department. It gives out to the public press agricultural facts taken from publications and official orders, and also from oral statements of specialists. Material so disseminated is set forth in such form as to attract public attention, be easily understandable, and lead to the adoption of the methods recommended. A Weekly News Letter is published. The office also prepares circulars, posters, and pamphlets designed to assist workers in carrying out educational and demonstration plans.

**Office of Inspection.** ALEX. MCC. ASHLEY, *in charge*.

Handles personnel matters; is charged with the accounting and administrative examination of claims and the preparation of financial reports involving appropriations under the Office of the Secretary; and assists in the fiscal operations of the bureaus.

**Forest Appeals.** THOMAS G. SHEARMAN, *in charge*.

This officer investigates for the Secretary of Agriculture appeals from decisions of the Forest Service, and reports his findings to the Secretary.

**Appointment Clerk.** R. W. ROBERTS.

The Appointment Clerk prepares all papers connected with appointments, transfers, promotions, reductions, details, furloughs, and removals, and has charge of correspondence with the Civil Service Commission. He is the custodian of oaths of office and personnel reports. He has the custody and use of the department seal.

**Office of Exhibits.** F. LAMSON-SCRIBNER, *Special Agent on Exhibits*.

The Office of Exhibits handles the correspondence of the department relative to exhibits at fairs and expositions of various kinds: cooperates with the several branches of the department in preparing exposition material: ships, installs, and cares for such exhibits; and investigates methods of displaying them.

## WEATHER BUREAU.

*Chief*, CHARLES F. MARVIN; *Assistant Chief*, C. C. CLARK; *Chief Clerk*, EDGAR B. CALVERT.

The Weather Bureau has charge of the forecasting of the weather; the issue and display of weather forecasts and storm, cold-wave, frost, and flood warnings; the gauging and reporting of river stages; the maintenance and operation of the United States Weather Bureau telegraph and telephone lines; the collection and transmission of marine intelligence for the benefit of commerce and navigation; the reporting of temperature and rainfall conditions for agricultural interests; and the taking of such meteorological and seismological observations as may be necessary to determine and record the climatic and seismic conditions of the United States.

**Forecast Division.** HENRY E. WILLIAMS, *in charge*.

This division receives and charts, twice daily, telegraphic reports of the prevailing weather conditions and issues a statement of impending weather changes in all parts of the country. In the case of severe disturbances warnings are issued to special storm-warning stations along the Lakes and the seacoast.

**River and Flood Division.** ALFRED J. HENRY, *in charge*.

This division gives information as to stages of water along the navigable rivers and issues flood warnings. It gathers information on the depth of snowfall in the mountains of the West, for a study of the flow of water in the streams supplying irrigation projects, and on the rate of evaporation from ponds and lakes, in the interest of water storage for irrigation, power development, and navigation. It supervises, on the part of the Weather Bureau, the experiment stations maintained jointly by the Weather Bureau and the Forest Service.

**Division of Agricultural Meteorology.** J. WARREN SMITH, *in charge*.

This division conducts studies regarding the relation of weather to crops, and collects statistical data required in such studies, having the direction and supervision of co-operative relations with the State experiment stations and other contributing organizations. It supervises the work of about 400 special stations, maintained in connection with the corn, wheat, cotton, sugar, rice, tobacco, fruit, and cattle industries. The division supervises the distribution of special warnings for the benefit of growers of certain crops. Data showing the current weather conditions throughout the country and the effects of those conditions upon important crops are collected and published weekly during the principal crop-growing season and monthly during the remainder of the year; and the issue of weather crop summaries at the various State centers is supervised.



**Climatological Division.** PRESTON C. DAY, *in charge.*

This division has charge of the collection, study, and publication of climatological data for the United States. It has general supervision of the work of about 4,200 cooperative stations, and about 42 special meteorological stations. From these stations are collected the records of daily observations of temperature, precipitation, and other meteorological conditions necessary to establish the history of the climate of the various portions of the United States. It also supervises the equipment and personnel of stations maintained in connection with the principal agricultural activities of the country. The division has supervision of a bulletin issued weekly during the winter months, showing depth of snow on ground, and thickness of ice in rivers and harbors, and from time to time issues special bulletins or papers bearing on climatological subjects. It has charge of the preparation of the climatological portions of the annual reports of the bureau, and supervises the monthly and annual summaries and other publications of the climatological services of the various States. This division has charge of the barometry of the United States, and of the preparation of the normals of pressure, temperature, precipitation, etc. It also collates from reports of marine observers meteorological information pertaining to the oceans, and is charged with the supervision of the radiotelegraph weather service of the Atlantic and Pacific coasts.

**Instrument Division.** BENJAMIN C. KADEL, *Chief.*

Has supervision of the entire meteorological instrumental equipment of the Weather Bureau, including exposures and installations at stations; the purchase, comparison, and adjustment of all new meteorological instruments and apparatus for stock and issue; the construction and repair of instruments and apparatus for station equipments; the purchase, installation, and maintenance of automatic recording river gauges, and of the storm-warning towers and lanterns employed at about 300 display stations on the sea-coasts and the Great Lakes; the inspection and personnel of storm-warning stations; and the evaporation work.

**Telegraph Division.** JOSEPH U. MUNROE, *Chief.*

This division receives and transmits all telegrams, arranges and controls telegraph circuits, maintains and repairs United States Weather Bureau telegraph and telephone lines and submarine cables, and examines all telegraph accounts.

**Library.** CHARLES F. TALMAN, *in charge.*

The library includes standard works of reference and technical books on meteorology and allied sciences and a complete file of the publications of meteorological and climatological services in all parts of the world. A catalogue is prepared of the meteorological contents of all the principal scientific periodicals of the world, including proceedings and transactions of societies. Translations from foreign languages are made in the library. The librarian has charge of the examinations held throughout the bureau for promotion to the scientific grades.

**Office of the Editor.** CLEVELAND ABBE, JR., *in charge.*

This office edits and supervises the publication of the Monthly Weather Review; it also has general editorial supervision over scientific and semiscientific papers submitted for publication by the bureau, calling attention to such of these as seem appropriate for the Monthly Weather Review or the Journal of Agricultural Research, the daily press, etc. It prepares such summaries and indexes as may be necessary and also notes on the progress of meteorology.

**Printing Division.** ROBERT SEYBOTH, *Chief.*

This division prints and mails the daily weather map and the various charts and miscellaneous printed matter pertaining to the bureau and has the custody of and distributes station forms.

**Division of Supplies.** BENJAMIN A. BLUNDON, *Chief.*

This division purchases and issues supplies and is charged with the safe-keeping of all property belonging to the bureau.

**Stations and Accounts Division.** DELOS T. MARING, *Chief.*

This division audits, adjusts, and prepares for payment all accounts and claims against the bureau; prepares advertisements; issues requests for passenger transportation; prepares the annual estimates of appropriations; transacts all business relating to the financial interests of the bureau; and supervises the construction of Weather Bureau buildings outside of Washington, including repairs thereto.

**Solar Radiation Investigations.** HERBERT H. KIMBALL, *in charge*.

Principally concerned with measurements of the rate at which heat is received at the surface of the earth by radiation during the day from the sun and sky combined and from each source separately; also that lost at night, and the relation of these measurements to atmospheric conditions.

**Seismological Investigations.** WILLIAM J. HUMPHREYS, *in charge*.

These investigations include the collection and study of both instrumental records and personal observations of earthquake phenomena throughout the United States. One of the immediate objects in view is the detailed mapping of the country with reference to existing faults on the lines of weakness of the earth's crust as evidenced by breaks or movements thereon that occasionally take place causing small local earthquakes. Such maps are of interest to those who have occasion to locate dams and similar important permanent structures.

**Aerological Investigations.** WILLIAM R. BLAIR, *in charge*.

This work includes the exploration of the upper atmosphere, to altitudes of 3 to 10 miles, by means of kites and balloons, and the discussion of the data thus obtained in its relation to conditions at the earth's surface. The principal observing station is now located at Drexel, Nebr., having been transferred from Mount Weather, Va.

**Weather Bureau stations and work outside of Washington, D. C.**

This bureau maintains throughout the United States, in the West Indies, and in Hawaii about 200 meteorological stations employing from 1 to 10 men each.

For forecast purposes the United States is divided into districts comprising: (1) The upper Mississippi Valley and the Northwest, Henry J. Cox, Chicago, Ill., in charge. (2) Louisiana, Texas, Arkansas, and Oklahoma, Isaac M. Cline, New Orleans, La., in charge. (3) Utah, Colorado, New Mexico, and Arizona, Frederick H. Brandenburg, Denver, Colo., in charge. (4) California and Nevada, George H. Willson, San Francisco, Cal., in charge. (5) Washington, Oregon, and Idaho, Edward A. Beals, Portland, Oreg., in charge. (6) The remainder of the United States, forecaster on duty (Harry C. Frankenfield or Edward H. Bowie), Washington, D. C., in charge.

For the collection and distribution of climatological data the United States, including Porto Rico and Hawaii, is divided into 45 sections, generally coextensive with States, which, with the names of the officials in charge and the section centers, are as follows:

Alabama: Patrick H. Smyth, Montgomery.

Alaska: Melvin B. Summers, Juneau.

Arizona: Robert Q. Grant, Phoenix.

Arkansas: Harvey S. Cole, Little Rock.

California: George H. Willson, San Francisco.

Colorado: Frederick H. Brandenburg, Denver.

Florida: Alexander J. Mitchell, Jacksonville.

Georgia: Charles F. von Herrmann, Atlanta.

Hawaii: Andrew M. Hamrick, Honolulu.

Idaho: Edward L. Wells, Boise.

Illinois: Clarence J. Root, Springfield.

Indiana: John H. Armington, Indianapolis.

Iowa: George M. Chappel, Des Moines.

Kansas: Thorp B. Jennings, Topeka.

Kentucky: Ferdinand J. Walz, Louisville.

Louisiana: Isaac M. Cline, New Orleans.

Maryland and Delaware: Oliver L. Fassig, Baltimore, Md.

Michigan: Charles F. Schneider, Grand Rapids.

Minnesota: Ulysses G. Purssell, Minneapolis.

Mississippi: William E. Barron, Vicksburg.

Missouri: George Reeder, Columbia.

Montana: Henry F. Alps, Helena.

Nebraska: George A. Loveland, Lincoln.

Nevada: Henry F. Alciatore, Reno.

New England: John W. Smith, Boston, Mass.

New Jersey: G. Harold Noyes, Trenton.

New Mexico: Charles E. Linney, Santa Fe.

New York: Wilford M. Wilson, Ithaca.

North Carolina: Lee A. Denson, Raleigh.

North Dakota: Orris W. Roberts, Bismarck.

Ohio: William H. Alexander, Columbus.

Oklahoma: J. Pemberton Slaughter, Oklahoma.

Oregon: Edward A. Beals, Portland.

Pennsylvania: George S. Bliss, Philadelphia.

Porto Rico: F. Eugene Hartwell, San Juan.

South Carolina: Richard H. Sullivan, Columbia.

South Dakota: Montello E. Blystone, Huron.

Tennessee: Roscoe Nunn, Nashville.

Texas: Bernard Bunnemeyer, Houston.

Utah: Alfred H. Thiessen, Salt Lake City.

Virginia: Edward A. Evans, Richmond.

Washington: George N. Salisbury, Seattle.

West Virginia: Henry C. Howe, Parkersburg.

Wisconsin: William P. Stewart, Milwaukee.

Wyoming: J. Cecil Alter, Cheyenne.

**BUREAU OF ANIMAL INDUSTRY.**

*Chief*, A. D. MELVIN; *Assistant Chief*, JOHN R. MOHLER; *Chief Clerk*, CHARLES C. CARROLL.

The Bureau of Animal Industry has charge of the work of the department relating to the live-stock industry. In general it deals with the investigation, control, and eradication of diseases of animals, the inspection and quarantine of live stock, the inspection of meat and meat food products, and with animal husbandry and dairying.

**Animal Husbandry Division.** GEORGE M. ROMMEL, *Chief*.

This division studies the breeding and feeding of farm animals and poultry, and passes upon the pure breeding of animals imported into the United States for breeding purposes. The division is engaged in work in cooperation with the War Department in encouraging the breeding of horses for military purposes. It studies also the cost of production of poultry and eggs, methods of improving the quality of farm eggs, and is engaged in the organization of boys' and girls' pig and poultry clubs in cooperation with the States Relation Service of the department and State agricultural colleges.

*Animal genetics*.—Sewall Wright, in charge.

*Beef cattle investigations*.—W. F. Ward, in charge; Wm. L. Horner, jr., S. H. Ray, J. Arnold Roth, Arthur T. Semple, Edmund H. Thompson.

*Horse and mule investigations*.—G. Arthur Bell, in charge; Benjamin F. Brandon, Charles C. Glenn.

*Poultry investigations*.—Harry M. Lamon, in charge; J. W. Kinghorne, Alfred R. Lee, R. R. Slocum, A. S. Weiant.

*Sheep and goat investigations*.—F. R. Marshall, in charge; Virgil O. McWhorter, R. B. Millin, J. F. Wilson.

*Swine investigations*.—Chief of Division Geo. M. Rommel, in charge; F. G. Ashbrook, J. D. Bebout, Ralph E. Gongwer.

*Animal husbandry extension and demonstration work*.—J. D. McVean; Geo. A. Scott.

*U. S. experimental farm, Beltsville, Md.*—E. L. Shaw, in charge.

*U. S. Morgan horse farm, Middlebury, Vt.*—W. F. Hammond, in charge.

**Biochemic Division.** M. DORSET, *Chief*.

This division prepares tuberculin and mallein for free distribution to health officers for use in official tests; conducts experiments with the object of obtaining vaccines and antitoxins for animal diseases; carries on researches concerning the causes of certain infectious diseases; takes part in the control of viruses, serums, toxins, and analogous products intended for use in the treatment of domestic animals; carries on experiments with dips and disinfectants; and assists in enforcing the insecticide act of 1910 by examining articles intended for use in combating insects and fungi which infest domestic animals. It carries on bacteriological and chemical research work relative to meat and meat food products in connection with the meat inspection.

*Scientists in charge of sections*.—J. A. Emery, assistant chief and member of the Insecticide and Fungicide Board; C. N. McBryde, in charge of bacteriological investigations of meats; R. M. Chapin, in charge of dips and disinfectants; Ralph Hoagland, in charge of biochemical investigations of meats; W. B. Niles, in charge of hog-cholera serum production; H. J. Shore, in charge of inspection of plants producing hog-cholera serum.

**Dairy Division.** B. H. RAWL, *Chief*.

This division collects and disseminates information concerning dairy farming, the care and improvement of dairy cattle, and the production, care, and distribution of dairy products. It is charged also with the details of administration of the laws concerning the inspection of factories and markets for "renovated" or "process" butter. It carries on research concerning the chemistry and bacteriology of dairy products and in engineering problems that affect various branches of the dairy industry. It also co-operates with State and local institutions in educational work in dairying.

*Miscellaneous*.—D. Stuart, dairy husbandry; H. P. Davis, editor; K. E. Parks and J. E. Bowen, dairy engineers; T. R. Pirtle, assistant in dairy manufacturing.

*Research laboratories*.—L. A. Rogers, in charge; S. H. Ayers, N. R. Blatherwick, F. R. Cammack, W. M. Clark, P. W. Clemmer, J. N. Currie, E. F. Deysher, D. C. Dyer, Alice C. Evans, W. T. Johnson, jr., H. M. Jones, H. C. Jordan, K. J. Matheson, G. A. Menge, E. B. Meigs, C. S. Mudge, P. Rupp, R. H. Shaw, O. E. Williams, P. A. Wright.

*Dairy farming investigations and demonstrations*.—Helmer Rabild, in charge; R. C. Jackson, J. C. McDowell, Melvin Moss. This work includes: (1) Southern dairying.—J. H. McClain, in charge; F. R. Farnham, W. W. Fitzpatrick, L. A. Higgins, W. H. Howell, C. A. Hutton, J. P. LaMaster, E. A. Onsrud, R. L. Pou, J. P. Quinerly, A. J. Reed,



G. N. Tobey. (2) Dairy work in tick-free areas.—J. A. Arey, O. M. Camburn, H. T. Converse, J. L. Graybill, R. H. Mason, T. W. Moseley, D. W. Watkins, H. H. Whiting. (3) Dairy community development.—R. R. Welch. (4) Cow-testing associations and bull associations, and dairy work with county agents.—H. C. Barker, F. A. Carroll, H. W. Cave, W. L. Kellogg, Ivan McKellip, W. A. McKerrow, K. B. Musser, J. B. McNulty, N. A. Negley, G. L. Oliver, D. H. Propps, H. C. Searles, H. G. Stevens, J. A. Waldron, J. G. Winkjer, G. E. Wolcott, H. E. Young. (5) Dairy demonstration farm in Texas.—S. B. Durham. (6) Holstein-Friesian breeding circuit in North Dakota.—U. J. Downey.

*Dairy manufacturing investigations and renovated-butter inspection.*—S. C. Thompson, in charge; E. L. Chaplin, T. Corneliuson, A. O. Dahlberg, C. F. Doane, L. S. Edwards, C. W. Fryhofer, C. M. Gere, G. A. Gilbert, J. C. Joslin, M. W. Lang, T. E. Meehan, F. L. Odell, M. P. A. Sondergaard, O. A. Storvick, J. L. Thomas, W. B. Thurston, William White.

*Market milk investigations.*—Ernest Kelly, in charge; J. B. Bain, H. B. Cannon, C. E. Clement, Stanley Combs, L. B. Cook, J. A. Gamble, R. J. Posson, R. S. Smith, G. B. Taylor.

*Western dairy investigations.*—J. E. Dorman, in charge; W. A. Barr, E. F. Burton, B. R. Eldredge, E. V. Ellington, O. E. Gibson, F. M. Hillman, C. F. Hoyt, N. C. Jamison, F. W. Kehrl, R. W. Latta, W. E. Meyer, V. E. Scott.

*Beltsville farm.*—T. E. Woodward, superintendent; W. R. Hale, assistant.

*Metabolism in dairy cows.*—H. P. Armsby, in charge; W. W. Braman, J. E. Mensching, J. A. Fries.

*Experiments and demonstrations in live-stock production.*—Iberia Live-Stock Farm, Jeanerette, La.: C. E. Mauldin, superintendent; Arthur Fischer, J. R. Quensenberry. Live-Stock Extension Service: G. E. Nesom, in charge; R. W. Kiser, W. R. Perkins, C. W. Radway, A. F. Rolf, C. H. Staples, T. R. H. Wright.

**Field Inspection Division.** R. A. RAMSEY, *Chief*; W. P. ELLENBERGER, *Assistant*.

This division, in cooperation with the State authorities, is charged with the work of eradicating scabies in cattle and sheep and the eradication of ticks which infest cattle and transmit disease; also, in cooperation with the Office of Indian Affairs and State authorities, with the eradication of glanders. It has supervision of the interstate transportation of live stock, including inspection, disinfection, certification, etc.; also of the details of administering the 28-hour law governing the humane handling of live stock in transit, and the tuberculin testing of cattle and the mallein testing of horses, etc., for interstate movement. This division has charge of the emergency work of eradicating foot-and-mouth disease.

*Inspectors in charge of scabies eradication in the field.*—H. J. Hammond, Sacramento, Cal.; William Hamilton, Walla Walla, Wash.; F. E. Murray, Salt Lake City, Utah; F. L. Schneider, Albuquerque, N. Mex.; W. E. Howe, Denver, Colo.; R. H. Treacy, Bismarck, N. Dak.; James Fleming, Kansas City, Kans.

*Interstate transportation of live stock.*—A. W. Miller, general supervisor.

*Inspectors in charge of tick eradication in the field.*—J. A. Kiernan, general supervisor, Birmingham, Ala.; L. J. Allen, Fort Worth, Tex.; W. L. Hiatt, McAlester, Okla.; A. E. Wight, Little Rock, Ark.; E. I. Smith, Baton Rouge, La.; R. E. Jackson, Birmingham, Ala.; J. A. Barger, Jackson, Miss.; W. M. MacKellar, Atlanta, Ga.; E. M. Nighbert, Jacksonville, Fla.; W. K. Lewis, Columbia, S. C.; E. P. Yager, Washington, N. C.

**Meat Inspection Division.** R. P. STEDDOM, *Chief*.

The work of the Meat Inspection Division includes the ante-mortem and post-mortem inspection of cattle, sheep, swine, and goats slaughtered at establishments engaged in interstate or foreign commerce; the supervision of such establishments and of the various processes of preparing, curing, canning, packing, etc., so as to insure sanitary conditions, equipment, and methods; the condemnation and proper disposal of carcasses and products found to be diseased, unwholesome, or otherwise unfit for human food; the marking and certification of meats and products that have been inspected and passed; and the regulation and supervision of the interstate transportation, exportation, and importation of meats and meat food products.

*Assistants.*—George Ditewig, in charge of western division; A. J. Pistor, in charge of eastern division.

G. H. Parks, architect; G. H. Shaw, sanitary engineer.

A directory showing the 240 meat-inspection stations and inspectors in charge may be obtained on application to the bureau.

**Miscellaneous Division.** A. M. FARRINGTON, *Chief*; IRVING W. PEW, *Assistant in charge of Appointment Section*.

This division keeps the records of the projects of work in which the bureau is engaged; has charge of the work relating to the personnel, such as appointments, transfers, assignments to duty, efficiency records, etc.; endeavors to promote veterinary education

and to assist veterinary colleges in providing adequate courses of instruction to qualify men for the veterinary service of the bureau; and attends to miscellaneous duties.

**Pathological Division.** JOHN R. MOHLER, *Chief*.

This division conducts scientific investigations of animal diseases; carries on experiments with immunizing agents for the purpose of protecting animals against disease; co-operates with the State agricultural experiment stations with a view to combating diseases peculiar to the localities; determines pathological specimens referred to the division for diagnosis; prepares and distributes blackleg vaccine; and investigates effects of poisonous plants on live stock.

*Scientific staff.*—Henry J. Washburn, senior bacteriologist; J. S. Buckley, in charge of field investigations; A. R. Ward, in charge of investigations of viruses, serums, and toxins; B. A. Gallagher, in charge of investigations concerning diseases of poultry and cold-blooded animals; Charles F. Flocken, in charge of cooperative experiments with the Minnesota Experiment Station; Robert J. Formad, assistant in animal pathology; George M. Potter, assistant in animal bacteriology; John M. Buck, bacteriologist, in charge of investigations in contagious abortion; Hadleigh Marsh, assisting in contagious abortion investigations; G. T. Creech, assisting in contagious abortion investigations; W. L. Williams, cooperating in investigations in contagious abortion; H. W. Schoening, in charge of experiments in dourine and glanders; L. T. Giltner, in charge of investigations of miscellaneous diseases of animals; F. H. Reynolds, in charge of blackleg investigations; R. A. Kelser, in charge of testing biological products; C. D. Marsh, in charge, A. B. Clawson, assistant, in investigations of poisonous plants; W. N. Berg, in charge of physiological investigations; H. C. Campbell, in charge of experiments in cooperation with the Pennsylvania Live Stock Sanitary Board; L. Enos Day, in charge of branch pathological laboratory at Chicago, Ill.; George Byron Morse, in charge of branch pathological laboratory at South Omaha, Nebr.

**Quarantine Division.** RICHARD W. HICKMAN, *Chief*.

The inspection and quarantine of imported animals with a view to excluding contagion, the management of the animal quarantine stations, and the inspection of live stock for export come under this division. The ships carrying exported animals are also inspected, and regulations as to fittings, equipment, ventilation, feed, water, attendants, etc., are enforced. The Quarantine Division administers the sanitary regulations governing the importation of hides and skins, glue stock, hair, wool, and other animal by-products, hay, straw, forage, etc., and directs the tuberculin testing of cattle and the mallein testing of horses for export and import. It also carries on work in cooperation with State and other authorities for the intrastate tuberculin testing of dairy and breeding cattle, with a view to eliminating tuberculosis from such cattle. Plans have been formulated to cooperate with State live-stock sanitary boards, breed-record associations, and individual breeders for the tuberculin testing and recording with the bureau of herds of pure-bred animals for breeding purposes, with the view to facilitating the sale, purchase, and interchange of animals certified as free from tuberculosis or exposure thereto through association with tuberculous animals.

*Staff.*—George W. Pope, assistant chief; B. T. Woodward, in charge of tuberculin testing of dairy and pure-bred breeding cattle.

**Zoological Division.** B. H. RANSOM, *Chief*.

This division investigates diseases of parasitic origin, collects and describes animal parasites of all kinds, determines such parasites as are sent to the bureau for identification, and keeps a card index of animal parasites and a bibliography of literature relating to them.

*Scientific Staff.*—Albert Hassall, assistant zoologist; Howard Crawley, in charge of investigations of parasitic protozoa; W. D. Foster and Benjamin Schwartz, junior zoologists; Marion Imes, in charge of investigations on the treatment of external parasites, Kansas City, Kans.; Cooper Curtice, in charge of experiments in the eradication and control of internal parasites of sheep, Vienna, Va.

**Experiment Station.** E. C. SCHROEDER, *Superintendent*.

The Experiment Station of the bureau is located at Bethesda, Md. It conducts investigations of animal diseases with a view to their control and eradication and their bearing on the public health. A small farm is maintained in such a manner as to provide the other divisions of the bureau with facilities for making observations for which large domestic animals are needed. The work of the station consists of both independent original investigations and investigations in cooperation with and supplemental to those of the other divisions.

*Assistants.*—W. E. Cotton, George W. Brett.

**Editorial Office.** JAMES M. PICKENS, *Editor*.

This office edits manuscripts prepared in the bureau, compiles and prepares information and material for publication and other uses, attends to correspondence relating to the publications and to miscellaneous subjects, makes translations, reads proof, duplicates circular letters, etc.

**FOREST SERVICE.**

*Forester*, HENRY S. GRAVES; *Associate Forester*, ALBERT F. POTTER;  
*Forest Inspector*, ARTHUR C. RINGLAND.

The Forest Service administers the national forests, studies forest conditions and methods of forest utilization, investigates the mechanical and physical properties of woods and the processes employed in the manufacture of forest products, and gathers information concerning the needs of the various wood-using industries and the relation of forests to the public welfare generally.

The work of the Forest Service is organized under the Office of the Forester, 6 branches, 7 districts, 153 national forests, and 21 purchase areas.

**Office of the Forester.**

**Office of the Editor.** HERBERT A. SMITH, *Editor*; FINDLEY BURNS, *in charge of technical review*; JOHN L. COBES, JR., *in charge of information*; DON CARLOS ELLIS, *in charge of educational cooperation*; C. M. BALLARD, *in charge of proofs and forms*.

This office disseminates information concerning forestry through the public press and other channels, and performs the editorial and educational work of the service, including the review and proof reading of publications and forms; cooperation with teachers, officers of public instruction, and others; the preparation, installation, and care of forest exhibits; and the care and use of the lantern-slide and photograph collections.

**Dendrologist.** GEORGE B. SUDWORTH.

The dendrologist is charged with investigations relating to the life history of native and exotic forest trees, their geographic distribution, distinguishing characteristics, habits and associations in the formation of forests, etc.; also the selection, adaptation, and care of trees for shade and ornamental purposes.

**Expert Lumberman.** EUGENE S. BRUCE.

The expert lumberman advises the Forester in matters regarding lumbering operations on the national forests and elsewhere.

**Accounts.** M. E. FAGAN, *Chief*.

This office is in charge of all fiscal affairs pertaining to the Forest Service—general bookkeeping, controlling accounts, allotments, and liabilities, and all operations of district fiscal agents.

**Branch of Operation.**

JAMES B. ADAMS, *Assistant Forester in charge*; D. D. BRONSON, *Forest Inspector*; ALLEN S. PECK, *Forest Inspector*; G. G. ANDERSON, *Inspector of Records*.

This branch has general supervision of estimates and allotments, personnel, quarters, equipment and supplies, and of fire protection and permanent improvement work on the national forests.

**Maintenance.** GEORGE A. BENTLEY, *Chief*.

The work of this office includes all matters relating to the care of quarters and the purchase and custody of supplies, furniture, instruments, and other equipment in Washington, D. C.

**Branch of Silviculture.**

W. B. GREELEY, *Assistant Forester in charge*; R. Y. STUART, *Forest Inspector*; E. E. CARTER, *Forest Inspector*; AUSTIN CARY, *Logging Engineer*; HARRY IRION, *Office Assistant*.

Through the district foresters the Branch of Silviculture has supervision of timber sales, timber and fire trespass, and reforestation on the national forests, and of working plans for their better administration. It cooperates with the States and private owners in fire protection and the practice of forestry.

**State Cooperation.** J. G. PETERS, *Chief*.

This office, in cooperation with the States, investigates forest conditions and suggests needed legislation and forest policies; prepares digests of State forest laws; cooperates



with a number of States, under the Weeks law (act of Mar. 1, 1911), in the protection of the watersheds of navigable streams; directs expenditures for this purpose; and inspects the work done in the field.

*Inspection.*—L. S. MURPHY.

**Development of Private Forestry.** E. S. BRYANT, *Chief*.

#### **Branch of Grazing.**

WILL C. BARNES, *Assistant Forester in charge*; J. W. NELSON, *Inspector of Grazing*.

The Branch of Grazing has, through the district foresters, general supervision of the range in the national forests. When the number of stock to be allowed on each national forest has been determined by the Secretary of Agriculture, the Branch of Grazing establishes the year-long grazing fee to be charged for each class of stock. It also conducts investigations concerning the best use of the forage resources of the national forests.

**Grazing Studies.** JAMES T. JARDINE, *Inspector of Grazing, in charge*.

This office deals with investigations aimed to bring about more efficient utilization by permitting live stock of the annual forage crop produced on ranges within national forests. It is also directing the survey and type classification of range lands within national forests by range reconnaissance.

#### **Branch of Lands.**

E. A. SHERMAN, *Assistant Forester in charge*; W. J. MANGAN, *Examiner*.

This branch has general supervision of all matters relating to the application of the public-land laws to the lands within the national forests, and the uses of national forest lands other than timber sales and grazing.

**Land Classification.** JOHN D. JONES, *in charge*.

Examination and classification of lands within the national forests to determine their value for forest purposes.

**Settlement.** F. L. HARVEY, *in charge*.

Administration of the forest homestead act of June 11, 1906.

**Boundaries.** B. L. WHEELER, *in charge*.

Revision of forest boundaries and general classification of lands within national forests as to their value for forest purposes.

**Entry Surveys.** R. V. R. REYNOLDS, *in charge*.

Survey of forest homesteads in the national forests under instructions issued by the surveyors general of the General Land Office.

**Claims and Occupancy.** CHARLES H. SQUIRE, *in charge*.

This office has general supervision of all work pertaining to the examination of, and reporting on, lands within the national forests title to which is sought under the public-land laws. Where the acquisition of title is opposed the office cooperates with the office of the Solicitor in procuring necessary evidence. The office also has general charge of all matters relating to the occupancy of national forest land for any purpose except grazing. This includes the granting of rights of way for railroads, irrigation projects, etc.

#### **Branch of Research.**

EARLE H. CLAPP, *Assistant Forester in charge*.

This branch has general supervision, either directly or through the district foresters, of forest investigations, protection studies, the silvicultural experiment stations, and the Forest Products Laboratory; investigations of wood, wood products, the lumber and other wood-using industries, logging costs, mill and market studies, forest statistics, including the collection of statistics of the wood-using industries, general economic questions bearing on forestry, and forest administration.

**Forest Investigations.** RAPHAEL ZON, *Chief*; S. T. DANA, *Assistant Chief*.

The Office of Forest Investigations deals mainly with the scientific problems underlying the management of forests. It directs the work at the national forest experiment stations through the district foresters and investigates the factors controlling the distribution of forests and forest trees, the relation of forest to stream flow and climate, the conditions under which natural regeneration of cut-over, burned-over, or otherwise denuded areas takes place, and the species and methods adapted to use in artificial reforestation under varying site conditions. It also studies the requirements of important

species as to climate, soil, moisture, and light. It identifies field specimens and studies the commercial and botanical range of trees. The office conducts investigations of wood-lots and, in cooperation with the extension agents of the States, demonstrates the best methods of handling them with special reference to marketing the product and caring for the timber crop. The library of the Forest Service is connected with this office; it contains 18,200 books and pamphlets on forestry and allied subjects.

*Studies.*—G. E. Clement, E. H. Frothingham, G. N. Lamb, Benton MacKaye, W. R. Mattoon, C. H. Shinn, W. D. Sterrett, C. R. Tillotson, E. R. Hodson.

*Forest Distribution.*—W. H. Lamb, Miss Georgie Wharton.

*Library.*—Miss H. E. Stockbridge.

*Forest Measurements.*—W. B. Barrows.

*Compilation.*—Miss Elizabeth B. Leech.

#### **Industrial Investigations.** H. S. BETTS, *in charge.*

This office studies the wood-using industries of various States, woods used in manufacture, and methods of disposing of mill waste; collects statistics on the price of lumber at the mill and at the principal distributing markets of the country; and studies specifications and grading rules. The office also secures statistics of importance to the experimental work of the service and studies the movements of lumber to and from the principal markets.

*Studies.*—W. D. Brush, J. T. Harris, R. K. Helpenstine, jr., J. C. Nellis, Franklin H. Smith, and A. H. Pierson.

#### **Forest Products Laboratory.** HOWARD F. WEISS, *Director*; C. P. WINSLOW, *Engineer in Forest Products.*

A forest-products laboratory is maintained in cooperation with the University of Wisconsin, at Madison. The laboratory conducts the following classes of experimental investigations in the utilization of forest products: (1) investigation of problems in experimental research; (2) experimental work in cooperation with commercial operations to verify laboratory experiments on a commercial scale; (3) cooperation with individuals or companies to assist them in applying principles and processes of proved commercial value. The lines of work pursued include wood preservation, wood chemistry, timber tests, and wood technology.

*Commercial Extension.*—Rolf Thelen.

*Review of Results.*—Frank J. Hallauer.

*Lumber Studies.*—D. G. White.

*Derived Products.*—Dr. S. F. Acree, *in charge*; Ernest Bateman, A. W. Schorger, F. W. Kressman, Howard N. Calderwood.

*Engineering.*—A. L. Heim, *in charge*; James O. Bixby.

*Maintenance.*—Chas. P. Juckem, *in charge.*

*Pulp and Paper.*—Dr. Otto Kress, *in charge*; Sidney D. Wells, H. E. Surface, G. C. McNaughton, Sidney E. Lunak, Clinton K. Textor.

*Timber Tests.*—John A. Newlin, *in charge*; A. K. Armstrong, Thomas R. C. Wilson, Leslie R. Morris, Robt. L. Pettigrew, I. L. Moore.

*Timber Physics.*—H. D. Tiemann, *in charge*; Eloise Gerry, M. E. Diemer, James E. Imrie, A. Koehler, Gertrude Griffin, Milton H. Hostman.

*Wood Preservation.*—C. H. Teesdale, *in charge*; Geo. M. Hunt, P. R. Hicks, M. C. Jensen.

*Pathology.*—C. J. Humphrey, *in charge*; Ruth M. Fleming.

#### **Branch of Engineering.**

O. C. MERRILL, *Chief Engineer in charge.*

This branch has general supervision of engineering matters, the administration of water-power uses, and preparation of road-development plans in connection with national forest administration, and cooperates with the other branches on plans, specifications, and technical details.

#### **Roads.** T. W. NORCROSS, *Assistant Chief Engineer in charge.*

General administration and field inspection of road work under the 10 per cent appropriation and Federal Aid Road Act. Examination and coordination of road plans for the several States, approval of road maps, plans, and specifications, and preparation of cooperative agreements with local authorities.

#### **Water Power.** LYLE A. WHITSIT, *Assistant Engineer in charge.*

General administration and field inspection of water-power and transmission line uses. Report upon applications for easements affecting national forest lands. Examination of proposed alienations, eliminations, additions, and withdrawals where water power is involved.

**Forest Maps and Surveys.** FRANK E. BONNER, *Assistant Engineer in charge*; C. A. KOLB.

General administration and field inspection of land, boundary, and other surveys. Establishment of standards in instruments and methods of survey. Supervision and field inspection of mapping and drafting, and maintenance of forest folios and map files.

#### **Acquisition of Lands under the Weeks Law.**

WM. L. HALL, *Assistant Forester in charge*; W. W. ASHE, *in charge of Examination of Lands*; R. DIEFFENBACH, *in charge of Survey of Lands*.

This office designates the areas where lands are to be purchased, receives proposals, examines lands, conducts tentative negotiations, prepares recommendations to the Secretary of Agriculture and the National Forest Reservation Commission, and makes surveys of lands to be acquired under the act of March 1, 1911, for the protection of the watersheds of navigable streams.

#### **Districts.**

*District 1.*—National forests in northern Idaho, Montana, North Dakota, and the north-west corner of South Dakota; headquarters at Missoula, Mont. F. A. Silcox, district forester; E. W. Kramer, district engineer.

*District 2.*—National forests in Colorado, Nebraska, the greater part of South Dakota, eastern and central Wyoming, Minnesota, and Michigan; headquarters at Denver, Colo. Smith Riley, district forester.

*District 3.*—National forests in most of Arizona and all of New Mexico; headquarters at Albuquerque, N. Mex. P. G. Redington, district forester.

*District 4.*—National forests in Utah, northwestern Arizona, most of Nevada, southern Idaho, and western Wyoming; headquarters at Ogden, Utah. L. F. Kneipp, district forester; J. P. Martin, district engineer; A. H. Cousins, property assistant; J. G. Falck, property auditor.

*District 5.*—National forests in California and western Nevada; headquarters at San Francisco, Cal. Coert Du Bois, district forester; F. H. Fowler, district engineer.

*District 6.*—National forests in Washington, Oregon, northwestern California, and Alaska; headquarters at Portland, Oreg. George H. Cecil, district forester; Leonard Lundgren, district engineer.

*District 7.*—National forests and purchase areas in Arkansas, Florida, Oklahoma, Porto Rico, South Carolina, Georgia, North Carolina, Tennessee, Virginia, West Virginia, and New Hampshire; headquarters at Washington, D. C. W. L. Hall, district forester; F. W. Reed, assistant district forester; H. O. Stabler, assistant district forester; Francis Kiefer, assistant district forester.

Within each district (except district 7) the Offices of Operation, Silviculture, Grazing, Products, and Lands perform duties similar to those performed by the corresponding branches outside the districts. The assistant district foresters in charge of these offices in the several districts are as follows:

*Operation.*—(1) R. H. Rutledge; (2) Fred. W. Morrell; (3) A. O. Waha; (4) A. C. McCain; (5) Roy Headley; (6) C. H. Flory.

*Silviculture.*—(1) J. F. Preston; (2) C. M. Granger; (3) O. M. Butler; (4) Clinton G. Smith; (5) T. D. Woodbury; (6) F. E. Ames.

*Grazing.*—(1) C. H. Adams; (2) John H. Hatton; (3) John Kerr; (4) Homer E. Fenn; (5) C. E. Rachford; (6) T. P. McKenzie.

*Products.*—(5) C. S. Smith; (6) H. B. Oakleaf; (7) S. L. Wolfe.

*Lands.*—(1) F. A. Fenn; (2) C. J. Stahl; (3) Frank C. W. Pooler; (4) C. N. Woods; (5) L. A. Barrett; (6) C. J. Buck.

#### **BUREAU OF PLANT INDUSTRY.**

*Physiologist and Pathologist and Chief of Bureau*, WILLIAM A. TAYLOR; *Physiologist and Assistant Chief of Bureau*, KARL F. KELLERMAN; *Chief Clerk*, JAMES E. JONES; *Officer in charge of Publications*, J. E. ROCKWELL; *Officer in charge of Records*, W. P. Cox.

The Bureau of Plant Industry studies plant life in all its relations to agriculture. The scientific work of the bureau is divided into 31 distinct groups, over each of which is placed a scientifically trained officer, who reports directly to the chief and assistant chief of the bureau. The work of the bureau is conducted on the project plan, the investigations under each of the offices being arranged by group projects consisting of closely related lines of work. These group projects are further divided into subprojects.



**Laboratory of Plant Pathology.** ERWIN F. SMITH, *Pathologist in charge.*

This is the central working laboratory for all of the pathological investigations conducted by the bureau. Studies of the diseases of a wide variety of crop plants are made in the laboratory and supplemented by field investigations and experimentation.

*Scientific staff.*—R. E. B. McKenney, pathologist; Frederick V. Rand, Florence Hedges, Nellie A. Brown, and Lucia McCulloch, assistant pathologists; Mary K. Bryan, Ella M. Enlows, and Lillian C. Cash, scientific assistants.

**Pathological Collections.** FLORA W. PATTERSON, *Mycologist in charge.*

This office maintains economic collections of pathological and related material; identifies edible and poisonous fungi; studies problems in entomogenous fungi; conducts taxonomic work in cooperation with various offices of the bureau; and makes miscellaneous identifications. In addition to securing new species of pathological fungi and systematically inserting them where they may be readily available for study, card indexes are maintained which refer to descriptions of fungi or relate to mycological or pathological subjects.

*Scientific staff.*—Vera K. Charles, assistant mycologist; Anna E. Jenkins, scientific assistant; Edith K. Cash, botanical translator.

**Fruit-disease Investigations.** MERTON B. WAITE, *Pathologist in charge.*

These studies deal with diseases of fruits and fruit trees and methods of controlling or preventing them. They cover deciduous orchard fruits, citrus fruits, small fruits, and the cultivated nuts. Field demonstrations are an important part of the work.

*Scientific staff.*—C. L. Shear, Charles Brooks, W. S. Ballard, Harry R. Fulton, J. W. Roberts, and Neil E. Stevens, pathologists; Clara H. Hasse, Durward F. Fisher, S. M. McMurran, and John R. Winston, assistant pathologists; J. S. Cooley, E. M. Harvey, Angie M. Beckwith, Lee M. Hutchins, Ned W. Lacey, Henry A. Lee, Bert A. Rudolph, Eugene A. Siegler, Horace W. Truesdell, and Raymond B. Wilcox, scientific assistants; J. M. Shull, botanical artist; and Leslie Pierce, assistant in spraying experiments and demonstrations.

**Eradication of Citrus Canker.** Directed by Assistant Chief of Bureau.

In cooperation with the Southern States in which citrus fruits are grown work is being conducted for the purpose of eradicating citrus canker, by the thorough inspection of nurseries and citrus groves, formalin treatment of infected soil, protective spraying of groves exposed to infection, and destruction of diseased trees. The following-named State officials are in local charge of the cooperative campaigns in their respective States, and approximately 625 agents are engaged in the work: Wilmon Newell, State plant commissioner, Florida; J. C. C. Price, acting State horticulturist, Alabama; E. Lee Worsham, State entomologist, Georgia; J. B. Garrett, acting director and entomologist of the North Louisiana Agricultural Experiment Station, Louisiana; R. W. Harned, State entomologist, Mississippi; Ed. L. Ayers, chief inspector of orchards and nurseries for the State, Texas.

**Investigations in Forest Pathology.** HAVEN METCALF, *Pathologist in charge.*

This office studies various diseases affecting forest trees and timber, as well as ornamental and shade trees. The work is conducted in close cooperation with the Forest Service.

*Scientific staff.*—George G. Hedgecock, C. J. Humphrey, and Perley Spaulding, pathologists; E. P. Meinecke, J. Franklin Collins, James R. Weir, William H. Long, and Carl P. Hartley, forest pathologists; John S. Boyce, George F. Gravatt, and Nicholas R. Hunt, assistant pathologists; Samuel B. Detwiler, forest inspector; Roy G. Pierce, forest assistant; Rush P. Marshall, pathological inspector; Ruby J. Tiller, Ruth M. Fleming, Ernest E. Hubert, Glenn G. Hahn, Gilbert B. Posey, and Paul V. Siggers, scientific assistants.

**Cotton and Truck Disease Investigations.** W. A. ORTON, *Pathologist in charge.*

These investigations cover diseases of garden vegetables, including field demonstration of methods of control and prevention; diseases of cotton and of cowpeas and other forage crops.

*Scientific staff.*—F. J. Pritchard and J. B. Norton, physiologists; L. P. Byars, H. A. Edson, W. W. Gilbert, L. L. Harter, and Louis O. Kunkel, pathologists; L. O. Watson and O. A. Pratt, assistant pathologists; Joseph Rosenbaum, mycologist; Wayland B. Clark, biochemist; H. G. MacMillan, scientific assistant; Michael Shapovalov, Jimmie L. Seal, J. A. Simpson, and Frank E. Boyd, agents.

**Crop Physiology and Breeding Investigations.** WALTER T. SWINGLE, *Physiologist in charge.*

This office investigates the physiology of crop plants with a view to determining the limiting factors which control their successful culture and the breeding and testing

of new varieties. Several field stations are maintained. Field investigations are conducted on some of the Indian reservations of the Southwest for testing crop plants which seem likely to be suited for culture by the Indians and by white settlers in adjoining regions. Dates, Smyrna figs, hardy citrus fruits, pistaches, and certain drought-resistant tree crops are being tested.

*Scientific staff.*—S. C. Mason, arboriculturist; G. P. Rixford, physiologist; S. H. Hastings, farm superintendent; Maude K. Swingle, botanical assistant; E. M. Savage, assistant plant breeder; Bruce Drummond, assistant; Tyozaburo Tanaka, botanical translator; Esten W. Campbell and Edgar A. Palmer, agents.

#### **Soil Bacteriology Investigations.** Directed by Assistant Chief of Bureau.

This work is a study of the relation of bacteria to soil fertility, plant growth, cellulose destruction, and the fixation of nitrogen. Pure cultures of nodule-forming bacteria for leguminous crops are distributed.

*Scientific staff.*—Felix Löhms, soil biologist; Ira G. McBeth, physiologist; F. M. Scales, assistant soil mycologist; F. L. Goll and R. C. Wright, assistant physiologists; Lewis T. Leonard and N. R. Smith, scientific assistants.

#### **Soil Fertility Investigations.** OSWALD SCHREINER, *Biochemist in charge.*

This office studies the causes of and remedy for infertility in certain soils, whether natural or arising from improper methods of cultivation and cropping. It separates, identifies, and studies certain organic substances found in unproductive soils, and corrects their evil effects by mechanical handling, by the use of fertilizers, and by other methods available to the farmer.

*Scientific staff.*—Bailey E. Brown, Joshua J. Skinner, Elbert C. Lathrop, and Edward H. Walters, biochemists; Alfred P. Dachnowski, physiologist; Fred R. Reid, Louis J. Gillespie, Lewis A. Hurst, and Louis E. Wise, assistant biochemists; James H. Beattie and Henry Winckelmann, scientific assistants; Albert M. Jackson, laboratory aid.

#### **Acclimatization and Adaptation of Crop Plants; Cotton Breeding.** O. F. Cook, *Biochemist in charge.*

These investigations have special reference to the acclimatization in the South and Southwest of Central American varieties of cotton, corn, and other tropical crop plants. The breeding of cottons for the boll-weevil territory is a special feature.

*Scientific staff.*—G. N. Collins and H. Pittier, botanists; D. A. Saunders, plant breeder; P. V. Cardon, assistant agronomist; Harlan D. Smith, assistant; W. E. Townsend, assistant agriculturist; C. B. Doyle, assistant botanist; G. B. Gilbert, J. H. Kempton, C. G. Marshall, and Guy S. Meloy, assistants in crop acclimatization; W. B. Camp, agent.

#### **Drug-Plant, Poisonous-Plant, Physiological, and Fermentation Investigations.** RODNEY H. TRUE and W. W. STOCKBERGER, *Physiologists in charge.*

This branch of the bureau studies the commercial culture of drug-producing crops and tea; stock-poisoning plants and methods of preventing the losses caused by them; and plant physiology and fermentation.

*Scientific staff.*—William Crocker, Heinrich Hasselbring, and Lon A. Hawkins, physiologists; Otis F. Black, Frank Rabak, and A. F. Sievers, chemical biologists; S. L. Jodidi, organic chemist; W. W. Eggleston, assistant botanist; T. B. Young, assistant agronomist; E. H. Kellogg and James Thompson, scientific assistants; Rodney B. Harvey, microanalyst; G. Archie Russell, expert; James W. Kelly, laboratory technician.

#### **Grain Standardization.** J. W. T. DUVEL, *Technologist in charge.*

These investigations relate to the harvesting of grain and its proper preparation for market; its handling, storing, and grading on the farm, at country elevators, and in the terminal markets; and its handling by transportation companies. The purpose is to fix definite standards for the grading of grain, so as to encourage the use of improved methods of handling and storing grain, and the production of grain of better quality. This work is conducted at Washington, D. C., and at branch laboratories located at Baltimore, Md.; Chicago, Ill.; Fargo, N. Dak.; Kansas City, Mo.; New Orleans, La.; and Portland, Oreg.

*Scientific staff.*—G. H. Baston, jr., J. H. Cox, J. H. Shollenberger, F. B. Wise, and Malon Yoder, assistants; Leroy L. Andrews, Joe D. Morgan, C. Louise Phillips, and Stephen A. Regan, scientific assistants; Edward Keiser, W. J. O'Loughlin, John C. Kerr, Harry A. Rhoades, Parker J. Bollman, Robert J. Green, W. H. McMurtrey, W. K. Marshall, W. F. Shanahan, and Myron W. Wilson, aids in grain standardization.

#### **Cereal Investigations.** MARK ALFRED CARLETON, *Cerealist in charge.*

This work deals with the culture, adaptation, improvement, and uses of cereal crops, the prevention of diseases affecting cereals, the cultivation and breeding of flax for seed



purposes, including a study of flax diseases, and the production and improvement of broom corn.

*Scientific staff.*—Carleton R. Ball, C. E. Chambliss, H. V. Harlan, C. E. Leighty, and C. W. Warburton, agronomists; Stephen Anthony, technologist in barley investigations; E. L. Adams, L. C. Aicher, C. H. Clark, J. Mitchell Jenkins, and F. A. Kiene, jr., assistant agronomists; John B. Sieglinger, assistant agriculturist; H. B. Humphrey, pathologist; A. A. Potter, assistant pathologist; John F. Ross and D. E. Stephens, farm superintendents; F. R. Babcock, Ross R. Childs, J. A. Clark, N. C. Donaldson, A. D. Ellison, Victor H. Florell, Charles W. Hungerford, J. W. Jones, J. H. Martin, J. D. Morrison, John H. Parker, B. E. Rothgeb, R. W. Smith, T. R. Stanton, and Theodore Stoa, scientific assistants; Charles S. Reddy, Felix J. Schneiderhan, John C. Brinsmade, jr., and G. A. McMurdo, assistants; L. R. Breithaupt, L. C. Burnett, W. T. Craig, A. G. Johnson, M. A. McCall, Horace M. Woolman, A. M. Christensen, John H. Hall, jr., H. R. Sumner, and F. J. Piemeisel, agents.

**Corn Investigations.** C. P. HARTLEY, *Physiologist in charge.*

These investigations are planned to determine the fundamental principles of corn improvement, adaptation, culture, and use that influence the quantity, quality, and profitability of corn production. They are conducted on the farms of interested corn growers throughout the United States, and the facts determined support the educational work with corn as conducted by corn clubs and demonstration agents.

*Scientific staff.*—Ernest B. Brown, physiologist; Curtis H. Kyle, assistant physiologist; J. G. Willier, Fred D. Richey, George J. Burt, Henry M. Steece, H. Howard Biggar, and Charles D. Bennett, scientific assistants; Marion E. Olson, Arthur A. Bryan, Rex H. Wickham, J. M. Hammerley, and H. S. Garrison, assistants.

**Tobacco and Plant Nutrition Investigations.** W. W. GARNER, *Physiologist in charge.*

The tobacco work has to do with the improvement of tobacco by hybridization and selection, the improvement of methods of growing and handling the crop, the combating of diseases, and the general study of the tobacco industry. Experiments and demonstrations in the growing of tobacco in rotation with farm crops are features of the work.

The plant-nutrition studies relate to some of the broad problems concerned in the growth and development of crop plants as affected by nutrition.

*Scientific staff.*—E. H. Mathewson and G. W. Harris, crop technologists; Otto Olson, E. G. Beinhart, D. E. Brown, W. M. Lunn, E. G. Moss, R. H. Milton, James P. Young, and James O. Evans, assistants in tobacco investigations; Charles W. Bacon and H. A. Allard, assistant physiologists; Charles L. Foubert, scientific assistant; Charles S. Ridgway, assistant in botanical laboratory work; R. H. Hartman, agent.

**Agricultural Technology.** N. A. COBB, *Technologist in charge.*

These investigations deal with the improvement of technological methods in crop production; the measurement of cotton staple, technological ginning investigations, and studies of free-living and plant-infesting nematodes.

*Scientific staff.*—W. E. Chambers, technologist; Albert Mann, plant morphologist; Emil G. Arzberger, pathologist.

**Paper-Plant Investigations.** Directed by C. J. BRAND, *Chief, Office of Markets and Rural Organization.*

This work has to do with the testing of plants believed to be suitable for paper manufacture.

*Scientific staff.*—Jason L. Merrill, paper plant chemist; George A. Stuart, assistant in paper-plant investigations; Robert E. Lofton, assistant physicist.

**Fiber-Plant Investigations.** L. H. DEWEY, *Botanist in charge.*

These investigations deal with the study of fiber plants likely to prove of value in the United States and the encouragement of fiber-plant industries.

*Scientific staff.*—Frank C. Miles, scientific assistant.

**Biophysical Investigations.** LYMAN J. BRIGGS, *Biophysicist in charge.*

This office studies physical problems connected with the work of the Bureau of Plant Industry. Attention is chiefly directed at present to biophysical problems in dry-land agriculture, the water requirements and nutrition of crop plants, the influence of the physical environment on crop growth, and investigations in electroculture.

*Scientific staff.*—C. A. Jensen, assistant in plant malnutrition; J. O. Belz, assistant; James F. Breazeale, J. W. McLane, and Julia R. Pearce, laboratory assistants; A. B. Campbell, mechanical assistant.

**Seed-testing Laboratories.** EDGAR BROWN, *Botanist in charge.*

These laboratories examine samples of commercial seeds for the presence of adulteration and conduct a general propaganda in the interest of pure seed for the farmer. The work is performed both in Washington, D. C., and at cooperative laboratories in the field.

*Scientific staff.*—F. H. Hillman, assistant botanist; W. L. Goss, George T. Harrington, Emma F. Sirrine, Bertha C. Hite, Anna M. Lute, Norma Waddle, Helen H. Henry, Cora Jacobs, Etta O. Gilbert, Jessie A. Lee, Grace M. Cole, Rachel E. Holmes, Mary L. Stott, and Emma S. Doyle, scientific assistants.

**Forage Crop Investigations.** CHARLES V. PIPER, *Agrostologist in charge.*

The forage crop investigations include methods of production; development and dissemination of new valuable varieties; extension of forage crops into sections where they are adapted but are grown only to a limited extent; and cooperation in the introduction and extension of new crops.

*Scientific staff.*—David Griffiths, agriculturist; R. A. Oakley, A. J. Pieters, H. N. Vinall, Lyman Carrier, and Samuel M. Tracy, agronomists; Roland McKee and Samuel D. Gray, assistant agrostologists; M. W. Evans, W. J. Morse, A. B. Cron, H. R. Cates, Samuel Garver, R. W. Edwards, Robert E. Getty, L. W. Kephart, Leroy Moomaw, Harvey L. Westover, H. S. Coe, Hiram R. Reed, and Alma R. White, scientific assistants.

**Alkali and Drought Resistant Plant Breeding Investigations.** T. H. KEARNEY, *Physiologist in charge.*

This office investigates the alkali resistance of crop plants; develops, by breeding and selection, strains of field crops which will be more resistant to drought than the varieties now obtainable; and studies the physiology of drought resistance. The work is conducted in close cooperation with other branches of the bureau concerned with the upbuilding of agriculture in the West and Southwest.

*Scientific staff.*—H. L. Shantz and A. C. Dillman, physiologists; R. L. Piemeisel, Phillip Norman Peter, Clyde F. Griswold, and Florian A. Cajori, scientific assistants; Walton G. Wells, assistant.

**Economic and Systematic Botany.** FREDERICK V. COVILLE, *Botanist in charge.*

This office maintains economic collections of cultivated plants and makes systematic studies of grasses and other economic plants, compiles information on native plants for publication, tests wild and little-known plants, and experiments with a view to the improvement of the grazing areas on the public lands.

*Scientific staff.*—A. S. Hitchcock, systematic agrostologist; W. E. Safford, economic botanist; P. L. Ricker and Ivar Tidestrom, assistant botanists; Agnes Chase, scientific assistant.

**Dry-Land Agriculture Investigations.** E. C. CHILCOTT, *Agriculturist in charge.*

This office studies proper cultural methods for the growing of crops in the semiarid regions of the West, especially in that portion known as the Great Plains area. The objects are to determine the best methods of soil preparation and crop rotation for the conservation of moisture and the maintenance of humus in the soil.

*Scientific staff.*—J. S. Cole, traveling field assistant; W. A. Peterson, J. M. Stephens, O. J. Grace, W. D. Griggs, F. L. Kelso, J. E. Mundell, and E. F. Chilcott, farm superintendents; C. B. Brown, A. L. Hallsted, J. H. Jacobson, L. N. Jensen, Joseph B. Kuska, Joseph P. Brandon, Francis E. Cobb, Albert Osenbrug, Arthur W. Schulz, Fay A. Wagner, Willard E. Lyness, O. R. Mathews, A. J. Ogaard, W. M. Osborn, M. Pfaender, J. T. Sarvis, H. G. Smith, R. S. Towle, J. C. Thysell, Leroy D. Willey, and Arthur E. Seamans, assistants; L. L. Zook, physiologist; G. W. Morgan, scientific assistant; Chas. H. Ruzika, agent; Robert Wilson, assistant in dry-land arboriculture.

**Western Irrigation Agriculture.** C. S. SCOFIELD, *Agriculturist in charge.*

The work is concerned with the development of profitable agriculture on the lands to be placed under irrigation in the western United States, and also with the testing of various crops suited for growth under irrigation. The work is conducted in cooperation with a number of the investigational offices of the bureau.

*Scientific staff.*—F. B. Headley, assistant agriculturist; Beyer Aune, R. E. Blair, Daniel Hansen, and Fritz Knorr, farm superintendents; Ernest W. Curtis, scientific assistant; J. A. Holden, Clarence R. Letteer, and Edward G. Noble, assistants in dry-land agriculture; George T. Ratcliffe, scientific assistant; C. E. Peterson, assistant in dry-land arboriculture; H. K. Dean, agriculturist, irrigated field crops.

**Sugar-Beet Investigations.** C. O. TOWNSEND, *Pathologist in charge.*

This office investigates all phases of sugar-beet growing, including cultural methods, breeding, diseases, and all other limiting factors. It also studies the relation of the

sugar-beet crop to all other activities on the farm, including crop rotation, stock raising, labor, markets, etc., so far as these factors have any bearing on the production of sugar beets; the culture and diseases of sugar cane with relation to the production of table sugar.

*Scientific staff.*—George F. Miles, pathologist; Edward S. G. Titus and W. W. Tracy, jr., technologists; P. A. Yoder, sugar-cane technologist; James W. Jones, agriculturist; Samuel B. Nuckols and Louis L. Corbett, assistant agriculturists; Wm. H. Burns, Joe G. Lill, and E. C. Rittue, assistants; L. E. Longley, scientific assistant; Julian K. Dale, junior chemist.

**Horticultural and Pomological Investigations.** L. C. CORBETT, *Horticulturist in charge.*

These investigations are concerned with the improvement of methods of growing, handling, shipping, and sorting perishable fruits and truck and related crops; landscape and vegetable gardening; floriculture, and related subjects. The work is subdivided into fruit-utilization investigations; fruit transportation and storage investigations; fruit-production investigations; viticultural investigations; nut-culture investigations; pomological breeding investigations, including the improvement of fruits by bud selection; miscellaneous investigations bearing on the development of the fruit industry; truck-crop investigations; landscape-gardening, floriculture, and miscellaneous horticultural investigations; potato investigations; fruit-history investigations; fruit-nomenclature investigations; and fruit-identification investigations.

*Scientific staff.*—C. P. Close, H. P. Gould, George C. Husmann, E. R. Lake, C. W. Mann, and H. J. Ramsey, pomologists; A. D. Shamel and Walter Van Fleet, physiologists; S. J. Dennis, refrigeration technologist; D. N. Shoemaker, William Stuart, F. L. Mulford, and H. C. Thompson, horticulturists; W. F. Wight, botanist; Chas. F. Clark, assistant agronomist; W. W. Tracy, sr., superintendent of testing gardens; C. S. Pomeroy and Leo B. Scott, assistant pomologists; C. A. Reed, nut culturist; Margaret Connor, George M. Darrow, Charles T. Dearing, George W. Dewey, C. L. Dyer, George L. Fischer, W. F. Fletcher, P. M. Lombard, Fred E. Miller, W. C. Quick, V. W. Ridley, Elmer Snyder, Edw. D. Vosbury, Arthur M. Grimes, Carl E. Schuster, Lawrence J. Reid, D. D. Ward, scientific assistants; F. L. Husmann, viticultural superintendent.

**Experimental Gardens and Grounds.** E. M. BYRNES, *Assistant in charge.*

This office is charged with the care and ornamentation of the department grounds, the maintenance of greenhouses and plant collections, and the propagation of plants for experimental and other purposes. Experimental work with florists' crops is also being conducted in the greenhouses.

**Congressional Seed Distribution.**

This work consists of the securing, packeting, and mailing of the quantities of vegetable, flower, and other seeds and plants necessary for congressional distribution, as well as the testing, propagation, and distribution of improved seeds of various crops.

*Staff.*—R. A. Oakley, agronomist in charge; Oliver F. Jones, executive assistant; J. E. W. Tracy, assistant superintendent of testing gardens; H. E. Juenemann, in charge bulb-testing gardens, Bellingham, Wash.; R. W. J. Vallentgoed, plant propagator.

**Foreign Seed and Plant Introduction.** DAVID FAIRCHILD, *Agricultural Explorer in charge.*

This office secures promising new seeds and plants, both by agricultural exploration and by correspondence, and these are tested at the plant-introduction gardens or through cooperation with other offices, experiment stations, experimenters, and private individuals. Investigations in plant propagation and in the development of certain plant industries are features of the work.

*Scientific staff.*—Beverly T. Galloway, plant pathologist; P. H. Dorsett, plant introducer, in charge of plant-introduction field stations; Peter Bisset, plant introducer, in charge of foreign plant distribution; Frank N. Meyer and Wilson Popenoe, agricultural explorers; George W. Oliver, plant breeder and propagator; H. C. Skeels, Stephen C. Stuntz, and R. A. Young, botanical assistants; David A. Bisset and Nathan Menderson, assistants in plant introduction; Glen P. Van Eseltine, assistant in botanical laboratory work; Robert L. Beagles, farm superintendent, in charge of plant-introduction field station, Chico, Cal.; Edward Simmonds, garden and field station superintendent, in charge of plant-introduction field station, Miami Fla.; John M. Rankin, assistant farm superintendent, in charge of Yarrow plant-introduction field station, Rockville, Md.; Edward Goucher, plant propagator, at plant-introduction field station, Rockville, Md.; and Henry Klopfer, plant propagator, at plant-introduction field station, Chico, Cal.; James E. Morrow, assistant superintendent of plant-introduction field station.



**Arlington Experimental Farm.** Directed by L. C. CORBETT, *Horticulturist*.

The Arlington farm is the field laboratory at Washington for the Bureau of Plant Industry, as well as for other bureaus of the department. Widely varying field tests are conducted on the farm.

*Staff*.—E. C. Butterfield, assistant horticulturist in general charge; J. H. Criswell, assistant superintendent.

**Demonstrations on Reclamation Projects.** F. D. FARRELL, *Agriculturist in charge*.

This office conducts demonstration work with individual farmers and farmers' organizations on the Government reclamation projects, for the purpose of assisting in the establishment of specific agricultural industries suited to the conditions on these projects.

*Scientific Staff*.—L. E. Cline, Harry A. Ireland, Roy P. Bean, Carl Christopher, Don G. Magruder, E. F. Rinehart, Paul S. Jones, and Harry A. Lindgren, agriculturists; Charles S. Jones, assistant.

**BUREAU OF CHEMISTRY.**

*Chief*, CARL L. ALSBERG; *Assistant Chief*, W. G. CAMPBELL; *Chief Clerk*, F. B. LINTON.

The Bureau of Chemistry is concerned primarily with questions of agricultural chemistry of public interest, the enforcement of the food and drugs act, analytical work, and investigations under the food and drugs act, and other chemical investigations referred to it by other branches of the Government service.

*Detailed to chief*.—J. F. Brewster, G. H. Mains, M. G. Mastin, W. E. Mathewson, B. McClelland, H. E. Patten, H. Runkel, R. R. Williams, and H. E. Woodward.

**Office of General Administration.** W. G. CAMPBELL, *Assistant Chief, in charge*.

S. H. Ross, assistant; A. E. Draper, librarian; R. H. Fuller, editor; J. G. Coleman and S. A. Postle, executive clerks.

**State Cooperative Food and Drug Control.** J. S. ABBOTT, *Chemist in charge*.

This office endeavors to promote close and cordial cooperation between State and Federal officials charged with the enforcement of all food and drug laws, works out policies for such cooperation, and seeks to unify and harmonize the work and policies of such officials.

*Assistant*.—F. C. Blanck.

**Sherley Amendment Office.** M. W. GLOVER, *Surgeon, U. S. P. H. S., in charge*.

This office has to do with the preparation of cases dealing with violations of the provisions of the Sherley amendment.

*Assistants*.—A. J. McIntyre, T. C. Merrill, and F. P. Morgan.

**Animal Physiological Chemical Laboratory.** F. C. WEBER, *Chemist in charge*.

The work in this laboratory includes metabolism and feeding experiments with foods, organic and inorganic compounds, and various carbohydrates; a complete study of infant foods and of the application of chemical methods to the determination of deterioration of animal foods; investigations in the canning of sardines and other marine products; experiments on the destruction of fly larvæ in their breeding places; and experimental work to improve the methods of analysis ordinarily employed in physiological chemistry.

*Scientific staff*.—H. W. Houghton and J. B. Wilson, assistants.

**Carbohydrate Laboratory.** C. S. HUDSON, *Chemist in charge*.

This laboratory analyzes sugars, sirups, molasses, honeys, jellies, jams, preserves, infant foods, confectionery, and similar substances in connection with the enforcement of the food and drugs act. Analyses are also made of all samples of sugars, starches, sirups, and molasses bought by the General Supply Committee. The laboratory investigates the manufacturing processes used in the production of raw and refined sugar and molasses, maple sugar, sirups from cane, maple, and sorghum, and confectionery and jellies. Improved methods of chemical analysis are studied, and also the characteristic constants by which pure carbohydrates are distinguished.

*Scientific staff*.—D. H. Brauns, J. K. Dale, A. J. Finks, T. S. Harding, J. M. Johnson, F. B. La Forge, S. F. Sherwood, M. N. Straughn, and E. Yanovsky, assistants.

**Color Investigation Laboratory.** H. D. GIBBS, *Chemist in charge*.

The various projects on the study of color substances which have been in progress in this bureau for some time are to be concentrated in this laboratory.

*Scientific staff*.—J. A. Ambler, W. F. Clarke, C. Conover, A. M. Doyle, G. A. Geiger, B. S. Levine, and H. A. Lubs, assistants.

**Drug Division.** L. F. KEBLER, *Chief*.

This division studies the properties, composition, and quality of drugs and medicinal preparations, and analyzes samples of such products taken in the enforcement of the food and drugs act. It also studies methods which may lead to more satisfactory analytical processes, especially for testing potent plant drugs and products derived from them.

*Scientific staff.*—H. E. Buchbinder, W. S. Hubbard, W. F. Kunke, and S. Palkin, assistants. Synthetic drug products laboratory; W. O. Emery, chief; C. D. Wright, assistant. Essential oil laboratory: E. K. Nelson, chief.

**Food Control Laboratory.** I. K. PHELPS, *Chemist in charge*.

The food control laboratory supervises the inspection of food products (not including cattle feeds) under the food and drugs act. This work includes the examination of analytical reports on official food samples, the consideration of cases prepared for citation or prosecution, handling of correspondence relating to cases, and to general questions arising under the food and drugs act as they relate to these products. Special studies are also made of the manufacture and production of food products, the analysis of dairy products, the analysis of flour, the bleaching of flour, the analysis of some fermented food products, and the identification of some of the products of fermentation in such food products.

*Scientific staff.*—M. Boyle, C. O. Dodge, O. L. Evenson, L. W. Ferris, D. H. Grant, M. J. Ingle, B. R. Jacobs, J. T. Keister, H. A. Lepper, W. T. McGeorge, A. S. Mitchell, H. S. Paine, H. E. Palmer, J. I. Palmore, and E. L. P. Treuthardt, assistants.

**Food Investigation Laboratory.** R. W. BALCOM, *Acting Chemist in charge*.

This laboratory conducts investigations that are necessary as a basis for the regulatory work in the food control. At the present moment the following problems are under investigation: The composition of commercial generator vinegar and the changes taking place in the conversion of cider into vinegar; the exact determination of the heavy metals in foods; some essential oils and synthetic flavors and flavoring extracts prepared therefrom.

*Scientific staff.*—A. R. Albright, W. D. Collins, E. G. Grab, and M. F. Lynch, assistants.

**Fruit and Vegetable Utilization Laboratory.** H. C. GORE, *Chemist in charge*.

This laboratory is investigating the utilization of surplus and cull fruits and vegetables. At present apples and potatoes are receiving the most attention. Much of this work is in cooperation with the Bureau of Plant Industry.

*Scientific staff.*—A. R. Thompson, assistant.

**Grain Dust Explosion Investigations.** D. J. PRICE, *Engineer in charge*.

Investigations are made of the causes of grain dust explosions in threshers, mills, and elevators with the view of determining the most effective means of preventing such explosions. The work is done in cooperation with the Office of Public Roads and Rural Engineering, the Bureau of Mines, Department of the Interior, and Pennsylvania State College.

*Scientific staff.*—H. H. Brown, assistant.

**Leather and Paper Laboratory.** F. P. VEITCH, *Chemist in charge*.

This laboratory conducts investigations of tannins and tanning materials, their effects upon the strength and properties of leather, and processes involved in their production; problems relating to the production of leather; the qualities of papers and their fitness for use in the Department of Agriculture and other departments of the Government which may request such investigations; the production of paper; the nature and uses of turpentine and resins, together with improved processes of production; the destructive distillation of wood and methods of improving the quality and quantity of the products; the grading, weighing, and handling of naval stores, and preparation of definite type samples therefor. Turpentine and rosin are examined under the food and drugs act. Papers, leathers, turpentine, resins, and textiles are examined for the departments of the Government requesting such work, and specifications are prepared for the purchase of these articles.

*Scientific staff.*—R. W. Frey, V. E. Grotlisch, H. P. Holman, E. O. Reed, J. S. Rogers, and G. C. Spencer, assistants.

**Microbiological Laboratory.** CHARLES THOM, *Mycologist in charge*.

This laboratory consists of a research section and a regulatory section and works upon the relation of molds and bacteria to food products. Its research projects cover studies of yeasts, oysters, sauerkraut, canned goods, deterioration of cereal products and of forage,

classification and activities of bacteria and molds, and the development and standardization of methods applicable to biological inspection work. Its regulatory staff conducts the bacteriological inspection of milk, oysters, gelatin, table waters, tomato products, canned foods, miscellaneous inspection samples in which spoilage is suspected, and samples submitted by the Insecticide and Fungicide Board.

*Scientific staff.*—V. Birckner, M. B. Church, G. G. De Bord, S. K. Farrar, E. Lefevre, A. T. Mattern, P. B. Parsons, H. W. Redfield, and L. A. Round, assistants.

**Microchemical Laboratory.** B. J. HOWARD, *Microscopist in charge.*

This laboratory makes microscopical and microchemical studies of foods, drugs, cattle feed, paper and textile materials, miscellaneous agricultural products, etc. It also makes microscopical examinations of insecticides and studies methods for their microscopical identification and estimation. Special attention is given to the histological study of fruits, spices, cereals, starches, and other agricultural products for the purpose of perfecting methods for detecting the adulteration of these products.

*Scientific staff.*—M. S. Allen, G. L. Keenan, E. A. Read, B. H. Silberberg, and C. H. Stephenson, assistants.

**Miscellaneous Division.** J. K. HAYWOOD, *Chief.*

This division comprises the insecticide and fungicide laboratory, a cattle food and grain investigation laboratory, and a trade wastes laboratory, and studies insecticides and fungicides, cattle foods, forage crops, grains, trade wastes, and certain hygienic problems, making analyses under the food and drugs act and the insecticide act, and performing such miscellaneous chemical work as may be referred to it. This division makes cooperative investigations of insecticides and fungicides for the Bureau of Entomology and Plant Industry and is engaged, with the latter bureau, in a number of cooperative studies of grain and forage crops. Much time is given to the investigation of new methods of analysis of insecticidal and fungicidal materials and to chemical investigations of insecticides and fungicides.

*Scientific staff.*—Cattle food and grain investigation laboratory: G. L. Bidwell, chemist in charge; C. E. Goodrich, J. B. Reed, P. H. Waldruff, and G. P. Walton, assistants. Insecticide and fungicide laboratory: C. C. McDonnell, chief; N. H. Borden, F. C. Cook, F. H. Eldred, J. G. Fairchild, J. J. T. Graham, E. L. Griffin, O. D. Knight, W. D. Lynch, R. N. Miller, W. J. Morgan, E. J. Nealon, R. C. Roark, L. P. Shippen, C. M. Smith, and C. G. Sutton, assistants. Trade wastes laboratory: Under J. K. Haywood, chief.

**Nitrogen Laboratory.** ———, *Chemist in charge.*

Nitrogen determinations for all laboratories of this bureau, as well as for many of the other bureaus of the department, are made in the nitrogen laboratory. Work in cooperation with the Association of Official Agricultural Chemists is also done, looking to the improvement of the methods for making these determinations.

*Scientific staff.*—H. W. Daudt, assistant.

**Oil, Fat, and Wax Laboratory.** H. S. BAILEY, *Chemist in charge.*

This laboratory analyzes oils, fats, cooking compounds, chocolates, nut butters, and similar substances in connection with the enforcement of the food and drugs act. It studies the chemical composition of American food oils, fats, and hydrogenated compounds, and carries on investigations in the production of such products.

*Scientific staff.*—L. B. Burnett, assistant.

**Pharmacognosy Laboratory.** A. VIEHOEVER, *Pharmacognosist in charge.*

This laboratory supervises the inspection of crude drugs under the food and drugs act. It investigates the chemical, physiological, and morphological characteristics of drugs and plants. It works on the improving of methods of drug analysis and on the establishing of standards for drugs and other plant products.

*Scientific staff.*—J. F. Clevenger and C. O. Ewing, assistants.

**Pharmacological Laboratory.** W. SALANT, *Pharmacologist in charge.*

This laboratory makes researches on the physiological action of poisonous substances occurring in food products and of drugs used as medicine, and physiological tests of drugs to ascertain the strength and purity of medicinal preparations found in the open market.

*Scientific staff.*—H. Connet, E. A. Hudon, E. W. Schwartz, G. E. Simpson, and A. M. Swanson, assistants.

**Phytochemical Laboratory.** F. B. POWER, *Chemist in charge.*

The purpose of this laboratory is to subject plants and vegetable drugs to a complete chemical investigation, with special consideration of such constituents as may represent their physiological activity. It thus endeavors to ascertain the possible utilization of various plants or their active principles as therapeutic agents, and also to facilitate the



detection of drugs in such medicinal preparations or other products as are subject to surveillance under the food and drugs act.

*Scientific staff.*—V. K. Chesnut, assistant.

**Plant Chemical Laboratory.** J. A. LE CLERC, *Chemist in charge.*

The plant chemical laboratory studies the chemistry of plants, with respect especially to climate and environment, both in the greenhouse and in the field; changes taking place in grain during germination, malting, and storage; and milling and breadmaking. Work is also done in collaboration with the Bureau of Plant Industry on problems connected with plant physiological chemistry.

*Scientific staff.*—L. H. Bailey, R. M. Bohn, J. Davidson, C. D. Garby, K. J. Osterhout, and H. L. Wessling, assistants.

**Protein Investigation Laboratory.** C. O. JOHNS, *Chemist in charge.*

This laboratory investigates and analyzes the proteins which occur in seeds and other vegetable substances used as foods. At present the proteins of the peanut, the jackbean, and kafir are under investigation. The purpose of these researches is to ascertain the nutritive value of the various proteins. Feeding experiments are conducted in cooperation with the Bureau of Animal Industry. Experimental work is also done to improve the methods used in the preparation and analysis of proteins.

*Scientific staff.*—L. H. Chernoff and D. B. Jones, assistants.

**Water Laboratory.** W. W. SKINNER, *Chemist in charge.*

This laboratory studies the composition of waters, brines, salts, and related products and analyzes samples of such products taken in the enforcement of the food and drugs act. It investigates sanitary problems relating to the production of bottled waters and technical problems in the purification of water, salt, etc.

*Scientific staff.*—C. H. Badger, W. F. Baughman, F. B. Furber, and J. W. Sale, assistants.

**Field Investigation Service.**

**Citrus By-Products Laboratory.** E. M. CHACE, *Chemist in charge.*

This laboratory directs its attention to devising methods for the utilization of cull oranges and lemons. With this in view, methods are being studied for the manufacture of citric acid, oils of lemon and of orange, concentrated orange juice, and orange vinegar.

*Scientific staff.*—C. G. Church, F. E. Denny, R. H. Kellner, and Norman C. Smith, assistants.

**Food Research Laboratory.** M. E. PENNINGTON, *in charge.*

The food research laboratory makes chemical, bacteriological, and histological studies of foods preserved by low temperatures. Milk, poultry, eggs, and fish have been the objects of investigation, with reference to their decomposition and putridity during preparation, transportation, storage, and marketing, in connection with the food and drugs act. A special investigation of frozen and dried eggs and egg products has been carried on, chiefly in the egg-breaking establishments, and with the cooperation of the industry; a similar investigation of fish, both fresh and frozen, is now being conducted.

*Scientific staff.*—H. C. Albin, E. D. Clark, L. E. Harker, T. S. Heines, E. C. Heinsohn, N. Hendrickson, J. S. Hepburn, M. K. Jenkins, H. A. McAleer, H. C. Pierce, R. L. Primm, C. M. Sherwood, H. L. Shrader, C. E. Sidler, G. C. Swan, and E. Witmer, assistants.

**Field Regulatory Service.**

**Food and Drug Inspection.**

The country has been divided into three food and drug inspection districts, Eastern, Central, and Western, each with a chief in charge, who has immediate supervision of the branch laboratories and the inspectors within his district. The eastern inspection district (R. E. Doolittle,<sup>1</sup> Washington, D. C.) includes the laboratories in Boston (E. J. Shanley<sup>2</sup>), Buffalo (L. Patton<sup>2</sup>), New York (————<sup>2</sup>), Philadelphia (C. S. Brinton<sup>2</sup>), San Juan (B. B. Wilcox<sup>2</sup>), Savannah (W. J. McGee<sup>2</sup>), and Washington (A. L. Sullivan<sup>2</sup>). The central inspection district (L. M. Tolman,<sup>1</sup> Chicago) includes the laboratories in Chicago (G. W. Hoover<sup>2</sup>), Cincinnati (L. B. Forst<sup>2</sup>), Minneapolis (E. H. Goodnow<sup>2</sup>), New Orleans (F. W. Liepsner<sup>2</sup>), and St. Louis (D. B. Bisbee<sup>2</sup>). The western inspection district (B. R. Hart,<sup>1</sup> San Francisco) includes the laboratories in Denver (R. S. Hiltner<sup>2</sup>), Honolulu (A. W. Hansen<sup>2</sup>), San Francisco (R. W. Hilts<sup>2</sup>), and Seattle (A. L. Knisely<sup>2</sup>). There is a corps of 45 food and drug inspectors in the field. The

<sup>1</sup> Chief.

<sup>2</sup> Chemist in charge.

taking of samples for analysis constitutes their chief duty, though special investigations in collaboration with the chemists are also made, and factories are inspected in which food and drugs are prepared. Examinations of samples are made for other branches of the Government service as may be necessary.

#### State Officials Authorized to Collect Samples Under the Food and Drugs Act.

*Alabama*.—J. A. Wade, Commissioner of Agriculture and Industries, Montgomery. *Arizona*.—Charles A. Meserve,<sup>1</sup> Director of State Laboratory, University of Arizona, Tucson. *Arkansas*.——, State health office, Little Rock. *California*.—E. J. Lea, University of California, Berkeley. *Colorado*.—John Lynch, State Board of Health, Denver. *Connecticut*.—Frank H. Stadtmueller, Dairy and Food Commissioner, Capitol Building, Hartford. *Delaware*.—A. E. Frantz, State Board of Health, Wilmington. *District of Columbia*.—William C. Woodward, Health Department, Washington. *Florida*.—W. A. McRae, Commissioner of Agriculture, Tallahassee. *Georgia*.—J. D. Price, Department of Agriculture, Atlanta. *Idaho*.—John K. White, Dairy, Food, and Sanitary Commissioner, Boise. *Illinois*.—W. Scott Matthews, Food Commission, 1627 Manhattan Building, Chicago. *Indiana*.—H. E. Barnard,<sup>1</sup> State Board of Health, Statehouse, Indianapolis; W. J. Jones, jr.,<sup>2</sup> Purdue University, Lafayette. *Iowa*.—W. B. Barney, Dairy and Food Commission, Des Moines. *Kansas*.—S. J. Crumbine, State Board of Health, Topeka; L. A. Flitz,<sup>2</sup> State Agricultural College, Manhattan. *Kentucky*.——, Food and Drug Department, Agricultural Experiment Station, Lexington; J. D. Turner,<sup>2</sup> Agricultural Experiment Station, Lexington. *Louisiana*.—Oscar Dowling, State Board of Health, New Orleans; Harry D. Wilson, Department of Agriculture and Immigration, Baton Rouge. *Maine*.—Wm. T. Guptill, Department of Agriculture, Augusta. *Massachusetts*.—Allan J. McLaughlin, Commissioner of Health, Boston; Philip H. Smith,<sup>2</sup> Agricultural Experiment Station, Amherst. *Michigan*.—James W. Helme, Dairy and Food Department, Lansing; A. J. Patten,<sup>2</sup> Agricultural Experiment Station, East Lansing. *Minnesota*.—J. J. Farrell, Dairy and Food Department, St. Paul. *Mississippi*.—W. F. Hand,<sup>1</sup> Agricultural and Mechanical College, Agricultural College. *Missouri*.—F. H. Fricke, Food and Drug Department, La Salle Building, St. Louis. *Montana*.—W. F. Cogswell, Department of Public Health, Helena. *Nebraska*.—Clarence E. Harman, Food, Drug, Dairy, and Oil Commission, Lincoln. *Nevada*.—Sanford C. Dinsmore,<sup>1</sup> Agricultural Experiment Station, Reno. *New Hampshire*.—Irving A. Watson, State Board of Health, Concord. *New Jersey*.—R. B. Fitz-Randolph,<sup>1</sup> State Board of Health, Trenton; C. S. Cathcart,<sup>2</sup> Agricultural Experiment Station, New Brunswick. *New York*.—Chas. S. Wilson, Department of Agriculture, Albany. *North Carolina*.—W. A. Graham, Department of Agriculture, Raleigh. *North Dakota*.—Edwin F. Ladd,<sup>1</sup> Agricultural Experiment Station, Agricultural College. *Ohio*.—T. L. Calvert, Dairy and Food Department, Columbus; S. K. Johnson,<sup>2</sup> Board of Agriculture, Columbus. *Oklahoma*.—John W. Duke, Department of Public Health, Oklahoma City; F. M. Gault,<sup>2</sup> Board of Agriculture, Oklahoma City. *Oregon*.—J. D. Mickle, Dairy and Food Commission, 510 Worcester Building, Portland. *Pennsylvania*.—James Foust, Department of Agriculture, Harrisburg. *Porto Rico*.—W. F. Lippitt, Service of Sanitation, P. O. Box 1108, San Juan. *Rhode Island*.—F. A. Jackson, Room 21, Statehouse, Providence. *South Carolina*.—E. J. Watson, Department of Agriculture, Commerce, and Industries, Statehouse, Columbia. *South Dakota*.—Guy G. Frary, Department of Food and Drugs, Vermillion. *Tennessee*.—H. L. Eskew, Department of Food and Drugs, Nashville; H. K. Bryson,<sup>2</sup> Commissioner of Agriculture, Nashville. *Texas*.—R. H. Hoffman, jr., Food and Drug Department, Austin; B. Youngblood,<sup>2</sup> Agricultural Experiment Station, College Station. *Utah*.—H. C. Smith, Dairy and Food Department, Salt Lake City. *Vermont*.—Charles F. Dalton, State Board of Health, 184 Church Street, Burlington. *Virginia*.—Benj. L. Purcell, Department of Agriculture and Immigration, Richmond. *Washington*.—J. J. Higgins, Department of Agriculture, Olympia. *Wisconsin*.—H. L. Russell,<sup>2</sup> Agricultural Experiment Station, Madison. *Wyoming*.—Maurice Groshon, Dairy, Food, and Oil Department, Cheyenne.

#### BUREAU OF SOILS.

*Soil Physicist and Chief of Bureau*, MILTON WHITNEY; *Chief Clerk*, A. G. RICE.

The Bureau of Soils investigates the relation of soils to climate and organic life; studies the texture and composition of soils in field and laboratory; and maps and classifies the soils in selected areas in the different parts of the country.

The bureau investigates domestic fertilizer resources, and carries on work looking to improvement in the methods of fertilizer manufacture, and to the discovery of new materials or new combinations of materials for use in fertilizers.

<sup>1</sup> Authorized to collect samples by virtue of appointment as collaborating chemist.

<sup>2</sup> Authorized to collect samples of feeds and feeding stuffs.



The bureau prepares annually the report of the Field Operations of the Bureau of Soils, which contains a detailed description of the soils and of the agricultural conditions of the various areas surveyed, points out the present use of the soils, and discusses possible changes in crops and methods of cultivation. Large-scale lithographic maps showing the distribution of the different kinds of soils accompany each report.

**Soil Chemical Investigations.** E. C. SHOREY, *Scientist in charge.*

Chemical laboratories are maintained for the investigation of the composition of soil types, the nature and occurrence of soil minerals, the composition of the soil solution, and the properties of soils in their relation to origin, texture, and productiveness. Routine chemical work in connection with the Soil Survey and other divisions of the bureau and other offices and bureaus of the department is also carried on.

*Scientific staff.*—W. H. Fry, R. F. Gardiner, William Hazen, C. F. Miller, W. B. Pope, W. O. Robinson, J. G. Smith, and L. A. Steinkoenig.

**Soil Physical Investigations.** R. O. E. DAVIS, *Scientist in charge.*

In the physical laboratories investigations of the properties of the soil are carried on and a study made of their economic bearing; the moisture relations, aeration, heat conductivity, texture, and other physical properties are investigated in their relation to soil productivity; mineralogical and mechanical analyses are made of soil types for the Soil Survey parties; and apparatus for field parties and for other divisions of the bureau is constructed and tested.

*Scientific staff.*—J. W. Bomboy, C. J. Crawley, L. H. Greathouse, L. B. Olmstead, W. B. Page, and D. B. Pratapas.

**Investigations of Fertilizer Resources.** FREDK. W. BROWN, *in charge.*

Investigations are made into the fertilizer resources of the United States with a view to discovering new sources of fertilizer materials and to utilizing for fertilizer many waste products; improvement in existing methods of manufacture and the study of new methods are carried out.

*Scientific staff.*—H. Bryan, J. N. Carothers, W. C. Crandall, J. A. Cullen, C. C. Fletcher, Paul J. Fox, A. R. Merz, W. J. O'Brien, W. H. Ross, J. P. Schroeder, E. B. Smith, J. W. Turrentine, W. H. Waggaman, Cary R. Wagner.

**Soil Survey Investigations.** CURTIS F. MARBUT, *Scientist in charge.*

The work of the Soil Survey includes the study of the field characteristics of soils, the formulation of definitions and descriptions for individual soil units on the basis of their field characteristics, the identification of the various soil units thus defined, and the determination of their distribution, area, relationships, and agriculture in the United States. The work is carried on mainly by the detailed study of small unit areas such as counties and experiment-station farms, in many cases in cooperation with various State organizations.

*Scientific staff.*—Inspectors: Southern division, H. H. Bennett and W. E. Hearn; Northern division, W. E. McLendon and T. D. Rice; Western division, M. H. Lapham. Soil specialists: J. A. Bonsteel and J. E. Lapham. Soil surveyors: J. H. Agee, A. C. Anderson, Mark Baldwin, Miles W. Beck, R. T. A. Burke, T. M. Bushnell, W. T. Carter, jr., W. B. Cobb, C. E. Deardorff, E. B. Deeter, J. E. Dunn, E. C. Eckmann, W. J. Geib, A. L. Goodman, E. C. Hall, H. W. Hawker, Frank A. Hayes, B. H. Hendrickson, L. C. Holmes, G. B. Jones, R. C. Jurney, J. A. Kerr, N. M. Kirk, A. E. Kocher, W. J. Latimer, H. G. Lewis, C. Loundsbury, R. W. McClure, E. T. Maxon, A. H. Meyer, C. N. Mooney, T. M. Morrison, A. L. Patrick, W. A. Rockie, R. F. Rogers, L. R. Schoenmann, E. H. Smies, H. C. Smith, W. G. Smith, J. M. Snyder, Edmund H. Stevens, A. T. Strahorn, A. T. Sweet, A. E. Taylor, W. E. Tharp, B. W. Thilman, E. S. Vanatta, C. VanDuyne, J. O. Veatch, W. I. Watkins, E. B. Watson, and R. A. Winston.

## BUREAU OF ENTOMOLOGY.

*Entomologist and Chief of Bureau,* L. O. HOWARD; *Entomologist and Assistant Chief of Bureau,* C. L. MARLATT; *Chief Clerk and Executive Assistant,* E. B. O'LEARY; *In charge of Library,* MABEL COLCORD.

The Bureau of Entomology studies insects with special reference to methods of control, experiments with the introduction of beneficial insects, makes tests with insecticides and insecticide machinery, and identifies insects sent in by inquirers. Field laboratories are located throughout the country.

**Investigations of Insects Affecting Southern Field Crops.** W. D. HUNTER, *Entomologist in charge.*

These investigations deal with insect pests of cotton, tobacco, sugar cane, and rice, and are planned to reveal practical methods of control. Special attention is given to the

Mexican cotton-boll weevil and its parasitic enemies. An investigation of the Argentine ant is included.

*Scientific staff.*—W. D. Pierce, A. C. Morgan, entomologists, Southern field crop insect investigations; J. L. Webb, T. E. Holloway, G. D. Smith, G. A. Runner, B. R. Goad, S. E. Crumb, J. D. Mitchell, U. C. Loftin, Henry Fox, and T. C. Barber, entomological assistants; E. A. McGregor, E. R. Barber, R. W. Moreland, J. U. Gilmore, F. L. McDonough, T. F. McGehee, and G. M. Anderson, scientific assistants.

**Cereal and Forage Insect Investigations.** —, *in charge.*

The range caterpillar, the clover and alfalfa seed chalcis fly, wireworms, the corn leaf-aphis and the corn root-aphis, the alfalfa weevil, the fall army worm, the Hessian fly, the alfalfa gall midge, the southern corn leaf-beetle, false wireworms, the alfalfa caterpillar, the chinch bug, white grubs, the western army cutworm, jointworms, the southern corn rootworm, the cowpea curculio, and the clover and alfalfa root curculio are among the objects of these investigations. Seventeen field stations in cooperation with the farmer are distributed over the United States. Thus insects involved in the injury of all cereal and forage crops are investigated from an economic point of view throughout the entire area of distribution. In this way it is practicable to investigate any insect as affected by every variation of condition under which the farmer is obliged to contend with it in his own fields. Investigations are carried out as far as possible in the fields of the farmer, who is thus enabled to see what is being done.

*Scientific staff.*—G. I. Reeves, W. J. Phillips, J. A. Hyslop, E. O. G. Kelly, J. J. Davis, C. N. Ainslie, W. R. Walton, J. M. Aldrich, A. B. Gahan, V. L. Wildermuth, T. D. Urbahn, G. G. Ainslie, Philip Luginbill, R. N. Wilson, R. A. Vickery, H. E. Smith, and P. B. Miles, entomological assistants; W. R. McConnell, C. W. Creel, E. H. Gibson, D. J. Caffrey, A. F. Satterthwait, L. P. Rockwood, T. R. Chamberlin, W. H. Larrimer, S. J. Snow, C. M. Packard, C. F. Turner, T. S. Wilson, A. H. Beyer, C. L. Scott, E. L. Barrett, W. T. Emery, F. H. Gates, C. C. Hill, W. E. Pennington, P. R. Myers, H. L. Parker, R. J. Kewley, L. J. Bower, G. W. Barber, J. S. Wade, L. J. Hogg, J. M. Langston, F. A. Fenton, S. L. Mason, and W. B. Turner, scientific assistants; G. F. White, expert.

**Investigations of Insects Affecting Deciduous Fruits.** A. L. QUAINANCE,  
*Entomologist in charge.*

Insects injurious to orchards, vineyards, and nut trees are studied in this work. Field laboratories are maintained in important fruit-growing regions, as in Pennsylvania, Michigan, Colorado, New Mexico, California, Florida, Virginia, and Washington State. Experiments in the use of insecticides and spraying apparatus are made. The important projects include: Investigations of apple insects, as the codling moth, apple borers, and apple aphids; investigations of peach insects, as the peach borer, plum curculio, etc.; investigations of grape insects, as the grape Phylloxera, grape-berry moth, and miscellaneous grape insects; and investigations of nut insects, as those affecting the pecan and chestnut. Other projects are: Cranberry and small-fruit insect investigations; investigations of orchard insecticides and spraying machinery; control of deciduous-fruit insects by natural agencies; and deciduous-fruit nursery insect investigations.

*Scientific staff.*—E. W. Scott,<sup>1</sup> F. E. Brooks, J. B. Gill, A. C. Baker, R. L. Nougaret, J. F. Strauss, R. A. Cushman, H. B. Scammell, E. B. Blakeslee, W. B. Wood, E. H. Siegler, J. H. Paine, and F. L. Simanton, entomological assistants; Alden T. Speare, mycoentomologist, Deciduous Fruit Insect Investigations; N. E. McIndoo, insect physiologist, Deciduous Fruit Insect Investigations; W. S. Abbott,<sup>1</sup> E. J. Newcomer, W. M. Davidson, A. J. Ackerman, R. J. Fiske, J. E. Dudley, jr.,<sup>1</sup> Dwight Isely, A. I. Fabis, H. J. Ingerson, H. K. Plank, B. R. Leach, and A. J. Flebut, scientific assistants.

**Investigations of Insects Affecting Tropical and Subtropical Fruits.** C. L. MARLATT, *Entomologist and Assistant Chief of Bureau in charge.*

Insects affecting all tropical and subtropical fruits are subjects of research, including those affecting the various species of citrus, olive, figs, etc., and greenhouse pests. The principal methods of control are investigated, namely, fumigation with hydrocyanic-acid gas, trapping, and spraying with contact and poison insecticides. The important projects include: Citrus-fruit insect investigations in California, citrus-fruit insect investigations in Florida, investigations of the Argentine ant in relation to citrus fruits, investigations of insects affecting tropical and subtropical plants in greenhouses, and investigations of miscellaneous subtropical insects.

*Scientific staff.*—R. S. Woglum, W. W. Yothers, and J. D. Neuls, entomological assistants; J. R. Horton and A. D. Borden, scientific assistants; E. R. Sasscer, H. L. Sanford, D. G. Tower, and H. L. Morrison, collaborators.

<sup>1</sup> Employed in "Enforcement of insecticide act."

**Investigations of the Mediterranean Fruit Fly.** C. L. MARLATI, *Entomologist and Assistant Chief of Bureau in charge.*

Investigation and control, in cooperation with the Federal Horticultural Board, of the Mediterranean and other fruit flies.

Determination of the geographical distribution and importance of fruit-fly enemies of cultivated fruits as a basis for adequate quarantine or regulatory action, including studies of life history, means of artificial control, and control through the introduction and distribution of natural enemies. The important projects include: Control of export Hawaiian fruit, control of foreign fruit offered for entry, investigations of foreign fruit offered for entry, and geographical-distribution and life-history studies of fruit flies.

*Scientific staff.*—E. A. Back, entomologist, Mediterranean and Other Fruit-fly Investigations; C. E. Pemberton, scientific assistant, H. F. Willard, fruit-fly quarantine inspector.

**Truck Crop and Stored Product Insect Investigations.** F. H. CHITTENDEN, *Entomologist in charge.*

Field studies of insects affecting vegetable and truck crops are being made in nine States. Projected work includes the control of wireworms and root-maggots, cutworms, and insects injurious to potato, sweet potato, tomato, onion, sugar beet, cabbage, cauliflower, cucumber, melons, beans, and peas. Similar studies are being conducted on insects injurious to vegetable and truck crops grown under glass under greenhouse conditions. Among stored products attacked by insects are wheat, corn, barley, oats, rye, and other grains; mill products, such as flour, meal, and other prepared cereals, seeds, dried fruits, nuts, and animal products, such as ham and other smoked and prepared meats; cheese, fish, and various fabrics. A special study is being made of export flour from the Gulf region, with similar work on insects introduced from foreign ports. New fumigants and other remedies for various pests are being tested in comparison with older methods.

*Scientific staff.*—C. H. Popenoe, T. H. Jones, M. M. High, F. A. Johnston, and D. E. Fink, entomological assistants; H. O. Marsh, F. B. Milliken, C. F. Stahl, F. R. Cole, A. B. Duckett, B. L. Boyden, R. E. Campbell, W. H. White, and Pauline M. Johnson, scientific assistants; N. F. Howard, specialist in insects as carriers of plant diseases; W. N. Dovener, expert.

**Forest Insect Investigations.** A. D. HOPKINS, *Forest Entomologist in charge.*

Investigations are conducted in the field and laboratory of the scientific and economic problems in connection with insects affecting forest, shade, and ornamental trees and hardy shrubs and forest products, with an ultimate view to the development and perfection of practical methods of control and prevention. These investigations include studies of beneficial as well as destructive insects as they affect such trees and shrubs in life and in all subsequent stages of use. Permanent field stations are distributed in the principal forested areas of the country, to serve as headquarters and centers of their respective districts, for the investigation of local insect problems. Demonstrations of practical control methods are undertaken through correspondence with, or direct supervision of, private individuals or officers in charge of forests, woodlots, parks, or city shade trees and ornamental shrubs.

*Scientific staff.*—J. M. Miller (in charge of Pacific Slope Station at Ashland, Oreg.), assistant forest entomologist; H. E. Burke (in charge of Forest Insect Laboratory at Los Gatos, Cal.), Josef Brunner (in charge of Northern Rocky Mountain Station at Missoula, Mont.), W. D. Edmonston (in charge of Southern Rocky Mountain Station at Colorado Springs, Colo.), T. E. Snyder and F. C. Craighead, specialists in forest entomology; Jacob Kotinsky and A. B. Champlain, assistants in forest entomology; L. C. Griffith, assistant in shade-tree insects; S. A. Rohwer, specialist in forest Hymenoptera (in charge of Eastern Station at East Falls Church, Va.); A. G. Boving, expert; C. T. Green, specialist on forest Diptera; W. S. Fisher, specialist on forest Coleoptera; Carl Heinrich, specialist on forest Lepidoptera; William Middleton, F. B. Herbert, F. P. Keen, and J. H. Pollock, scientific assistants.

**Investigations of Insects Affecting the Health of Man and Animals.** Under immediate direction of the Chief of Bureau and W. D. Hunter.

This field covers the relation between certain ticks and spotted fever, mosquitoes and malaria and yellow fever, and the house fly and typhoid fever. The investigations also deal with insects as internal and external parasites of animals and seek practical methods for their control. A number of pests affecting domestic animals, including the cattle tick, the stable fly, and the horn fly, are being studied.

*Scientific staff.*—D. L. Van Dine, entomologist, insects affecting health of man; F. C. Bishopp, entomologist, insects affecting health of animals; W. V. King, A. H. Jennings, H. P. Wood, and D. C. Parman, entomological assistants; R. H. Hutchison, E. W. Laake, and W. E. Dove, scientific assistants.



**Investigations in Bee Culture.** E. F. PHILLIPS, *Apiculturist in charge.*

The structure, development, and behavior of the bee are being investigated. Special attention is given to methods of wintering with chief emphasis at present on the proper temperature of the bee cellar and methods of preparing colonies of bees for outdoor wintering. Bee diseases are being thoroughly studied. The ultimate object is to furnish helpful information to the bee keeper.

*Scientific staff.*—G. S. Demuth and A. H. McCray, apicultural assistants; J. A. Nelson, expert; G. H. Rae and C. E. Bartholomew, agents.

**Gipsy Moth and Brown-tail Moth Investigations.** A. F. BURGESS, *Entomologist in charge.*

A large field force is maintained in New England in the work of preventing the spread of these two moths. A laboratory has been established for the assemblage, study, and liberation of imported parasites and diseases affecting these moths. The work of the parasites and their natural enemies is studied in the field and many experiments are conducted for the purpose of devising better methods for use in field operations. A quarantine is maintained, and all products likely to carry these insects are inspected before they are shipped from the infested area.

*Scientific staff.*—L. H. Worthley, agent, preventing spread of moths; D. M. Rogers, assistant in charge of gipsy-moth quarantine and inspection; S. S. Crossman, C. W. Collins, R. W. Glaser, F. H. Mosher, R. Wooldridge, J. J. Culver, and C. W. Stockwell, entomological assistants; J. N. Summers, J. V. Shaffner, jr., H. A. Preston, C. E. Hood, H. W. Allen, R. T. Webber, D. W. Jones, J. W. Bradley, scientific assistants; G. E. Clement, Willis Munro, and O. D. Ingall, assistants in forest management; H. L. McIntyre, C. W. Minott, H. W. Vinton, D. G. Murphy, A. W. Young, H. R. Gooch, M. B. Shepherd, W. A. Shinkwin, A. M. Wilcox, L. E. Gibson, H. L. Blaisdell, F. W. Foster, I. T. Guild, J. E. R. Holbrook, C. B. Russell, D. D. Landers, W. A. Collins, F. W. Graham, H. I. Winchester, P. S. Coffin, H. J. Miles, and T. A. McGarr, gipsy-moth assistants; H. A. Ames, H. N. Bean, F. W. Graves, jr., and C. E. Totman, general foremen.

**Miscellaneous Investigations.** Under immediate direction of the Chief of Bureau.

The naming, classification, and establishment of the systematic relationships of all insects which are being studied in the various laboratories of the bureau, and the identification of similar material submitted by the agricultural experiment stations and by scientific workers, are included under this head.

*Scientific staff.*—August Busck, Rolla P. Currie, H. G. Dyar, Frederick Knab, C. H. T. Townsend, and C. S. Menagn, entomological assistants; E. A. Schwarz, A. N. Caudell, and H. S. Barber, assistants; A. A. Girault, expert on Chalcidoidea.

**Editorial Office.** ROLLA P. CURRIE, *Entomological assistant, in charge*; B. A. REYNOLDS, *Assistant.*

The editorial office attends to the editing of manuscripts, the reading of proofs of publications and other printed matter, the preparation of indexes and abstracts, correspondence relating to manuscripts, proofs, and publications, and other work of a similar nature.

**BUREAU OF BIOLOGICAL SURVEY.**

*Biologist and Chief of Bureau,* E. W. NELSON; *Assistant Chief,* W. C. HENDERSON; *Expert in Game Conservation,* T. S. PALMER; *Administrative Assistant,* A. B. MORRISON; *Chief Clerk and Executive Assistant,* E. J. THOMPSON; *Clerk in Charge of Editorial Work,* W. H. CHESMAN.

The Biological Survey has charge of the work of the department relating to the control and conservation of wild birds and mammals and investigations of their relation to agriculture. It studies their food habits and investigates methods of protecting beneficial species and controlling harmful ones; experiments in fur farming; controls noxious mammals in national forests and on the public domain; makes biological surveys of areas, studies the geographic distribution of wild animals and plants, and maps natural life zones; supervises national mammal and bird reservations; and administers Federal laws protecting birds and game and regulating interstate commerce in game and imports of birds and mammals.

*Consulting biologists.*—H. W. Henshaw and C. H. Merriam.

**Economic Investigations.**

A. K. FISHER, *Assistant in charge.*

**Destruction of Noxious Rodents.** W. B. BELL and S. E. PIPER, *Assistant Biologists.*

Under this project extensive campaigns are carried on in national forests and on the public domain to control depredations of prairie-dogs, ground squirrels, pocket gophers,

rabbits, and other rodents destructive to forest, orchard, and nursery stock, farm produce, and ranges. Demonstrations also are made in farming districts of improved methods of combating these animals.

*Scientific staff.*—D. E. Lantz, T. H. Scheffer. *Assistants.*—J. G. Crick, U. S. Ebner, D. A. Gilchrist, R. T. Jackson, W. C. Jacobsen, Joseph Keyes, James Silver, A. F. Taylor, R. A. Ward, J. R. Williams, and C. M. Yerrington.

**Destruction of Predatory Mammals.** W. B. BELL and S. E. PIPER, *Assistant Biologists.*

Active campaigns are undertaken for the extermination of wolves, coyotes, mountain lions, and other animals destructive of live stock and poultry.

*Field inspectors.*—E. F. Averill, R. E. Bateman, C. J. Bayer, L. B. Crawford, L. J. Goldman, G. E. Holman, C. R. Landon, J. S. Ligon, and E. R. Sans.

**Fur-Farming Investigations.** NED DEARBORN, *Assistant Biologist.*

Investigations in fur farming are concerned with determining productive and economical methods of rearing foxes, minks, martens, and other fur animals in captivity, and ascertaining the areas suited to this industry.

**Economic Ornithology.** W. L. MCATEE, *Assistant Biologist.*

This section investigates the food habits of birds for the purpose of determining the value of birds to agriculture, horticulture, and forestry. By laboratory analyses of stomach contents and by field observations birds are classed as beneficial, neutral, or harmful in their relations to man, and recommendations made for the protection of useful species and the repression of injurious ones. The food habits of waterfowl and upland game birds are investigated with a view to securing information of use in increasing the food supply in depleted areas. Methods of attracting desirable species about homes are studied and recommended.

*Scientific staff.*—R. A. Emmons, I. N. Gabrielson, E. G. Holt, J. D. Hood, L. O. Jackson, E. R. Kalmbach, D. C. Mabbott, H. L. Vlerek, and Alexander Wetmore.

**Biological Investigations.**

E. W. NELSON, *Chief, in charge.*

Under this division investigations are conducted in the field to determine the geographic distribution of native wild life, and technical studies are made of groups and species to ascertain relationships and correct classification. The information gathered serves as a foundation for the efficient handling of most of the problems of the Survey. The published results appear in the form of reports on special groups of birds and mammals; also, on the birds and mammals of States and special areas, with maps and charts showing distribution of species and life-zone areas.

**Biological Surveys and Distribution of Mammals.** VERNON BAILEY, *Chief Field Naturalist*, and E. A. PREBLE, *Assistant Biologist.*

This section conducts investigations to determine the distribution of native animals and plants. Maps are made showing areas occupied by each species of mammal and the summer and winter ranges and migration routes of birds, and from the combined data the natural distribution areas and life zones of the country are outlined. North American mammals are studied in order to determine the distribution, habits, and value of the different species and to secure data concerning areas to be restocked with big game; also to locate suitable areas for fur farming. Specimens of mammals are identified for Government bureaus, scientific and educational institutions, and private individuals.

*Scientific staff.*—E. A. Goldman, A. H. Howell, H. H. T. Jackson, H. C. Oberholser, and W. P. Taylor.

**Distribution and Migration of Birds.** H. C. OBERHOLSER, *Assistant Biologist.*

This section investigates the migration of North American birds, mainly through reports from several hundred volunteer observers and through the work of field parties. The data obtained serve as a basis for protective legislation, both State and national. A national count of birds, made each spring by several hundred observers throughout the United States, is also of value in connection with the conservation and increase of useful species. Enumerations of migratory waterfowl, combined with an investigation of conditions in their breeding grounds and winter resorts, furnish information which will greatly assist in the conservation of these birds. Specimens of birds are identified for Government bureaus and for educational institutions, museums, and private individuals.

*Scientific staff.*—Francis Harper, A. H. Howell, and E. A. Preble.

**Interstate Commerce in Game.**W. F. BANCROFT, *Assistant in charge.*

This division issues permits for importations and regulates the entry of foreign wild birds and mammals; issues permits for shipments from Alaska of specimens for scientific and exhibition purposes. Information concerning game is prepared for publication; a card index of State game laws and various indexes of information concerning game protection are maintained; and summaries of State and Federal game laws and a directory of game officials are issued annually. Violations of the Lacey Act, regulating interstate commerce in game, which covers not only birds and game shipped to market but also interstate shipments of plumage, are investigated by the field force, the necessary evidence is collected, and the first steps taken in preparing each case for legal action.

*Assistant.*—F. L. Earnshaw. *Field assistants.*—C. F. Asmuth (Milwaukee, Wis.), E. C. Higgins (Salem, Mo.), and E. V. Visart (Little Rock, Ark.).

**Mammal and Bird Reservations.**G. W. FIELD, *Assistant in charge.*

This division has supervision over the 70 Federal bird reservations; the Montana National Bison Range; the Winter Elk Refuge in Jackson Hole, Wyoming; and the game preserves on the Wind Cave National Park, South Dakota, and Sullys Hill National Park, North Dakota (2 bird reservations also, the Niobrara Reservation, Nebraska, and the Aleutian Islands Reservation, Alaska, are stocked with big game as well as birds, making in effect a total of 6 big game preserves and 68 bird reservations).

*Reservation inspectors.*—F. M. Dille (Denver, Colo.), George Willett (Los Angeles, Cal.), G. G. Cantwell (Puyallup, Wash.), and B. J. Pacetti (Ponce Park, Fla.).

**Federal Migratory Bird Law.**G. A. LAWYER, *Assistant in charge.*

This division administers the Federal migratory bird law and publishes and enforces regulations made thereunder for the protection of migratory game and insectivorous birds. The law is administered in cooperation with State authorities with the aid of some 200 State deputies commissioned as Federal wardens, who act under the direction of 16 inspectors, each assigned to a definite district.

*Assistant.*—J. E. Mercer. *District inspectors.*—F. W. Hennessy, Providence, R. I.; P. S. Farnham, Owego, N. Y.; T. T. Bloxom, Locustville, Va.; H. H. Bailey, Newport News, Va.; T. S. Meekins, Manteo, N. C.; J. H. Rice, jr., Ritter, S. C.; W. S. Hanson, Fort Myers, Fla.; S. W. Linebaugh, Russellville, Ky.; B. G. Merrill, Hinsdale, Ill.; W. D. Wacaser, Mount Pulaski, Ill.; E. A. Cleasby, Eau Claire, Wis.; Harry Barmer, Dubuque, Iowa; R. P. Holland, Atchison, Kans.; H. H. Kopman, New Orleans, La.; Ralph Benton, Los Angeles, Cal.; E. S. Catron, Portland, Oreg.

**DIVISION OF ACCOUNTS AND DISBURSEMENTS.***Chief of Division and Disbursing Clerk, A. ZAPPONE.*

This division has charge of the disbursement of public funds appropriated for the Department of Agriculture, and the keeping of accounts and appropriate ledgers in connection therewith.

**Cashier's Section.** W. J. NEVIUS, *Cashier and Chief Clerk, in charge.*

This section prepares and mails all checks and handles all moneys received and disbursed.

**Bookkeeper's Section.** F. W. LEGGE, *Accountant and Bookkeeper, in charge.*

This section keeps the books pertaining to the fiscal affairs of the department, prepares requisitions on the Treasury for advance of public funds, and compiles quarterly abstracts of expenditures and collections and an account current covering the liability for public funds.

**Examining Section.** EVERETT D. YERBY, *Supervising Auditor, in charge.*

This section examines all accounts before payment.

**Miscellaneous Section.** W. R. FUCHS, *Deputy Disbursing Clerk, in charge.*

This section handles the vouchers in connection with the Weeks forestry law and performs miscellaneous work not assigned to other sections.



## DIVISION OF PUBLICATIONS.

*Editor and Chief*, JOS. A. ARNOLD; *Editor and Assistant Chief*, B. D. STALLINGS; *Chief Clerk*, A. I. MUDD.

The Division of Publications conducts all business of the department transacted with the Government Printing Office; has general supervision of all printing, including the editing, indexing, illustration, binding, and distribution of publications, and the maintenance of mailing lists.

**Editorial Work.** B. D. STALLINGS, *Editor and Assistant Chief, in charge.*

This work includes editing manuscripts and giving directions for printing, correcting proofs, and inspecting completed work.

*Editorial corps.*—R. B. Handy, Ephraim Cornman, William F. Harding, George W. Kennedy, Stanley Searles, T. K. Burrows, Delos M. Carter, and R. S. Moore, assistant editors.

**Indexing.** CHARLES H. GREATHOUSE, *Assistant Editor in charge.*

Two kinds of indexes are made: (1) Indexes to be printed with individual publications; (2) a general card index, by subjects, of all publications of the department. Congressional documents are obtained for department officials, and the Congressional Record is marked daily for their attention.

**Illustrations.** A. B. BOETTCHER, *Assistant in charge.*

Drawings and photographs are made for use in illustrating publications and also for use in the various branches of the department's work. Photographic prints and lantern slides are sold to the public.

**Document Section.** FRANCIS J. P. CLEARY, *Assistant in charge.*

This section receives and distributes the publications designed for departmental use; mails circulars and documents not intended for public distribution; furnishes mailing lists and makes orders upon the Public Printer for the mailing of publications intended for the public; specifies the publications to be sent in response to miscellaneous requests; prepares correspondence relating to the publications and keeps all records of the distribution, including the Congressional quotas of Farmers' Bulletins; addresses franks and envelopes, and prepares addresses for mailing lists, of which a general index is kept up to date; and duplicates official circulars, as well as the information prepared for the press.

## BUREAU OF CROP ESTIMATES.

*Statistician and Chief of Bureau*, LEON M. ESTABROOK; *Assistant Chief of Bureau*, NAT C. MURRAY; *Chief of Division of Crop Reports*, SAMUEL A. JONES; *Assistant Chief of Division of Crop Reports*, EDWARD CRANE; *Chief of Division of Crop Records*, FRANK ANDREWS; *Chief Clerk*, H. B. CRAMER; *Statistical Scientists*, GEORGE K. HOLMES, CHARLES M. DAUGHERTY, and F. J. BLAIR.

The Bureau of Crop Estimates collects crop data, issues the monthly crop reports of the department, prepares the statistical portion of the Department Yearbook, and conducts special inquiries relative to estimates of United States and foreign crops for inclusion in bulletins and correspondence.

**Crop Reporting Board.**

A Crop Reporting Board, consisting of the chief of bureau (chairman) and five other members selected from the officials and agents of the bureau, considers in secret session all available data and issues periodic reports relative to acreage in planting season, condition and indicated yield during the growing season, and production and yield at harvest time of all speculative crops. The chief of bureau and his assistants consider data and issue corresponding reports for non-speculative crops and live stock.

**Division of Crop Reports.**

*Field service.*—The service outside of Washington consists of 45 field agents, 8 crop specialists, and various independent lists of voluntary reporters, numbering in all approximately 160,000. The field agents and crop specialists keep in touch with the best informed opinion throughout their districts by travel and by maintenance of special corps of reporters, and render periodic reports for their respective territories. Of the voluntary correspondents the county reporters submit reports regularly for their respective counties and the township reporters for their respective localities. Summaries of reports from these three independent sources form the bases of the reports issued by the bureau. Special lists of reporters are maintained for special inquiries.

*Clerical force.*—The clerical force of the Division of Crop Reports maintains various independent lists of voluntary crop reporters to whom regular and special blank schedules of inquiry are submitted for data desired. The information so secured is tabulated and arranged in convenient form for study and analysis by the Statistician and Crop Reporting Board.

#### **Division of Crop Records.**

The Division of Crop Records collects and makes available for study and use data relative to the agricultural products of the United States and foreign countries, prepares tables and special articles for the Department Yearbook and bulletins, provides statistical information in response to special inquiries, and conducts inquiries relative to various statistical phases of agriculture. A well-equipped library of agricultural statistics is maintained.

#### **LIBRARY.**

*Librarian*, CLARIBEL R. BARNETT; *Assistant Librarian*, EMMA B. HAWKS.

The department library, consisting of the main library and the various bureau, division, and office libraries, contains approximately 137,000 books and pamphlets, including an extensive collection on agriculture and all its branches, a large and representative collection on the sciences related to agriculture, and a good collection of standard reference books. In addition to the department use, books are lent to college and experiment station libraries and other institutions for use in connection with the researches of these institutions. Periodicals currently received number more than 2,300. A dictionary card catalogue is maintained consisting of about 347,000 cards. Printed catalogue cards for publications of the department are prepared by the department library and printed at the Library of Congress. The librarian has charge of the foreign mailing lists for department publications.

#### **STATES RELATIONS SERVICE.**

*Director*, A. C. TRUE.

The States Relations Service represents the Secretary of Agriculture in his relations with the State agricultural colleges and experiment stations under the acts of Congress granting funds to these institutions for agricultural experiment stations and cooperative extension work in agriculture and home economics, and in carrying out the provisions of acts of Congress making appropriations to this department for farmers' cooperative demonstration work, investigations relating to agricultural schools, farmers' institutes and home economics, and the maintenance of agricultural experiment stations in Alaska, Hawaii, Porto Rico, and Guam.

#### **Office of the Director.**

EUGENE MERRITT, *Administrative Assistant*; MRS. C. E. JOHNSTON, *Chief Clerk*; F. E. SINGLETON, *Chief Accountant*; Miss E. L. OGDEN, *Librarian*.

#### **Editorial Division.** W. H. BEAL, *Chief*.

This division edits and prepares for printing all publications of the States Relations Service except the Experiment Station Record; cooperates with the Division of Publications in maintaining mailing lists and in the distribution of publications of the service; and has charge of lantern slides and other illustrative material.

*Staff.*—R. W. Trullinger, specialist in soils and rural engineering and in charge of section of illustrative material; C. H. Hanson, specialist in illustrative material.

#### **Investigations on Agricultural Instruction in Schools.** C. H. LANE, *Chief Specialist in Agricultural Education*.

These investigations include studies of the methods and subject matter of school instruction in agriculture in this and other countries, with a view to determining the needs of such instruction in order to make it practically useful to students who are to become farmers or workers in agricultural institutions, and to furnish schools with up-to-date and properly organized subject matter and illustrative materials in the various branches of agriculture, to supplement and reinforce textbooks and field practices.

*Staff.*—E. A. Miller and F. E. Heald, specialists in agricultural education; H. P. Barrows, assistant in agricultural education; Marie T. Spethmann, compiler and statistical clerk.

#### **Investigations on Farmers' Institutes and Movable Schools.** J. M. STEDMAN, *Farmers' Institute Specialist*.

These investigations include studies on farmers' institutes, movable agricultural schools, and similar organizations carried on in this and other countries, especially with a view



to devising and experimenting with modified or new methods adapted to conditions in the United States, and to providing farmers' institute and extension workers with publications and illustrative material especially adapted to their needs.

*Staff.*—H. B. Hendrick and H. M. Conolly, assistants in agricultural education.

### **Office of Experiment Stations.**

**E. W. ALLEN**, *Chief*, and *Editor of Experiment Station Record*.

#### **Relations with Institutions for Agricultural Research.**

Under this head the office is broadly organized to give the State agricultural experiment stations such advice and assistance as will best promote their efficiency. It also collects and disseminates information regarding similar institutions throughout the world. Among its activities in relation to the stations are the following:

*Examination of work and expenditures of the State experiment stations.*—The office supervises the Federal funds granted to the State agricultural experiment stations under the acts of Congress of March 2, 1887, and March 16, 1906, with respect to the use made of these funds and the kind of work for which they are employed. This duty is assigned especially to the Chief, with the assistance of W. H. Beal, Walter H. Evans, J. I. Schulte, and E. V. Wilcox.

*Experiment Station Record.*—The office publishes *Experiment Station Record*, a periodical which gives abstracts of the bulletins and annual reports of the experiment stations, of the publications of the Department of Agriculture, and of publications reporting investigations in agricultural science in the different countries of the world. The *Record* also contains editorials and notes bearing upon station work. The staff of the *Record* is as follows: Editor, E. W. Allen; assistant editor, H. L. Knight; agricultural chemistry and agrotechny, E. H. Nollau; meteorology, soils, and fertilizers, W. H. Beal and R. W. Trullinger; agricultural botany, bacteriology, and plant pathology, W. H. Evans and W. E. Boyd; field crops, J. I. Schulte and J. D. Luckett; horticulture and forestry, E. J. Glasson; foods and human nutrition, C. F. Langworthy and H. L. Lang; zootechny, dairying, and dairy farming, ——— and M. D. Moore; economic zoology and entomology, W. A. Hooker; veterinary medicine, W. A. Hooker and E. H. Nollau; rural engineering, R. W. Trullinger; rural economics, Eugene Merritt; agricultural education, C. H. Lane; indexes, M. D. Moore.

#### **Division of Insular Experiment Stations.** **WALTER H. EVANS**, *Chief*.

The experiment stations in Alaska, Hawaii, Porto Rico, and Guam are conducted under the general direction of this division.

##### **Alaska Agricultural Experiment Stations.** **C. C. GEORGESON**, Sitka, *Agronomist in charge*.

The main station in Alaska is at Sitka. Investigations are also carried on at Rampart, in the Yukon Valley; at Kodiak; and at Fairbanks, in the valley of the Tanana River. The work consists of field experiments with vegetables, cereals, and forage plants; horticultural investigations; the maintenance of live stock; the curing of hay and silage; the distribution of seeds; and an agricultural survey of the Territory.

*Staff.*—G. W. Gasser, assistant in charge, Rampart; M. D. Snodgrass, assistant in charge, Kodiak; H. E. Pratt, animal husbandman, Kodiak; J. C. Laney, assistant dairyman, Kodiak; J. W. Neal, assistant in charge, Fairbanks; T. D. Crippen, assistant, Fairbanks.

##### **Hawaii Agricultural Experiment Station.** **J. M. WESTGATE**, Honolulu, *Agronomist in charge*.

The activities of this station are concerned with cotton, rice, forage crops, fiber, and horticultural plants; with soils, plant diseases, insects, and extension work. In cooperation with the Hawaiian Government, a demonstration farm is maintained on the island of Hawaii, and a marketing division in Honolulu.

*Staff.*—J. E. Higgins, horticulturist; M. O. Johnson, chemist; Alice R. Thompson, assistant chemist; C. W. Carpenter, plant pathologist; J. B. Thompson, assistant agronomist in charge of Glenwood substation; C. A. Sahr, assistant agronomist; F. G. Krauss, superintendent of extension work; A. T. Longley, in charge of cooperative marketing investigations.

##### **Porto Rico Agricultural Experiment Station.** **D. W. MAY**, Mayaguez, *Agronomist in charge*.

Investigations of this station relate especially to the growing of coffee, field crops, and horticultural plants, the development of animal husbandry and dairying, soils, vegetable pathology, and entomology. Extension and demonstration work has also been organized.

*Staff.*—P. L. Gile, chemist; J. O. Carrero, assistant chemist; C. F. Kinman, horticulturist; T. B. McClelland, assistant horticulturist; R. H. Van Zwaluwenburg, entomologist; E. W. Brandes, plant pathologist; H. C. Henricksen and W. A. Mace, assistants in extension work.

**Guam Agricultural Experiment Station.** A. C. HARTENBOWER, Guam, *Agronomist in charge.*

The station in Guam is located near Agaña, the principal town. Experiments are being conducted in improved methods of cultivation, introduction and improvement of tropical agricultural crops, and introduction of improved live stock.

*Staff.*—C. W. Edwards, animal husbandman; P. Nelson, assistant.

### Office of Extension Work in the South.

BRADFORD KNAPP, *Chief.*

### Relations with Extension Divisions of Agricultural Colleges in 15 Southern States.

Under this head the office cooperates with the extension divisions of the State agricultural colleges within its territory in their extension work in agriculture and home economics, under the act of Congress of May 8, 1914. It also acts as an agency for coordinating the extension work of the several bureaus of the department with similar work carried on by the agricultural colleges.

### Farmers' Cooperative Demonstration Work.

Under this head extension and demonstration work on all subjects relating to agriculture, home economics, and rural life generally is carried on through practical demonstrations and instruction under the supervision and management of State, district, and county agents working with individuals and through organizations of farm men and women and boys' and girls' clubs. This work is supported by direct congressional appropriation to the department, but is done in cooperation with State colleges of agriculture, departments of agriculture and education, county governments and organizations, and others. In the cotton territory the work includes the teaching and demonstration of methods of meeting the ravages of the cotton-boll weevil.

*States.*—Texas, Oklahoma, Louisiana, Arkansas, Tennessee, Mississippi, Alabama, Georgia, Florida, South Carolina, North Carolina, Virginia, Maryland, West Virginia, and Kentucky.

*Scientific staff.*—County agent work: J. A. Evans, assistant chief and assistant field agent for Oklahoma, Texas, Mississippi, Alabama, South Carolina, Georgia, and Florida; W. D. Bentley, agriculturist and field agent for Oklahoma and Texas, and in general charge of cooperative projects; W. B. Mercier, agriculturist and field agent for Arkansas, Louisiana, Tennessee, and North Carolina; H. E. Savely, agriculturist and field agent for Mississippi, Alabama, South Carolina, Georgia, and Florida; ———, agriculturist and field agent for Kentucky, Maryland, Virginia, and West Virginia. Boys' and girls' club work and home demonstration work: O. B. Martin, assistant in general charge; I. W. Hill, assistant in boys' club work; Mary E. Creswell and Ola Powell, assistants in home demonstration and girls' club work.

H. W. Barber, assistant in charge of crop records and statistics.

W. H. Conway, executive assistant.

Specialists detailed by subject-matter divisions of the department to act through the Office of Extension Work in the South in relation to the field work in the various Southern States: J. D. McVean, representing animal husbandry; J. H. McClain, representing dairy husbandry; W. R. Mattoon, representing forestry; ———, representing poultry husbandry; C. L. Goodrich, representing farm management; Kenneth Hawkins, representing bee-culture; and L. O. Watson, representing cotton and truck crop diseases.

*Field extension staff.*—County agent and boys' club work (men agents): 15 State agents, 25 assistant State agents, 51 district agents, 746 county agents, 55 local agents, 19 special community leaders in club work, 8 specialists. Home demonstrations and girls' club work (women agents): 15 State agents, 22 assistant State agents, 9 district agents, 412 county agents, 5 local agents. Total, 1,382.

### Office of Extension Work in the North and West.

C. B. SMITH, *Chief.*

### Relations with Extension Divisions of Agricultural Colleges in 33 Northern and Western States.

Under this head the office cooperates with the extension divisions of the State agricultural colleges within its territory in their plans and expenditures for extension work in agriculture and home economics under the act of Congress of May 8, 1914. It also

acts as an agency for coordinating the extension work of the several bureaus of the department with similar work carried on by the agricultural colleges.

### **Farmers' Cooperative Demonstration Work.**

Under this head extension and demonstration work on subjects relating to agriculture, home economics, and rural life generally is carried on through practical demonstrations and instruction under the supervision and management of State, district, and county agents working through organizations of farm men and women and boys' and girls' clubs. This work is in cooperation with State colleges of agriculture, county governments and organizations, and others. Demonstrations in farm management form a special line of work.

*States.*—Arizona, California, Colorado, Connecticut, Delaware, Idaho, Illinois, Indiana, Iowa, Kansas, Maine, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, South Dakota, Utah, Vermont, Washington, Wisconsin, Wyoming.

*Scientific staff.*—Cooperative relations: L. A. Clinton, assistant chief, in charge; D. W. Working and R. W. Redman, agriculturists; A. B. Graham, assistant agriculturist. County agent work: W. A. Lloyd, agriculturist, in charge; H. B. Fuller, W. M. Cook, O. S. Fisher, L. R. Simons, and H. J. Wilder, agriculturists; H. W. Gilbertson, assistant agriculturist. Boys' and girls' club work: O. H. Benson, agriculturist, in charge; G. E. Farrell, assistant agriculturist. Farm management demonstrations: L. H. Goddard, agriculturist, in charge; E. A. Brown, assistant agriculturist; W. D. Hill and P. K. Whelpton, scientific assistants. Extension work with farm women: Florence E. Ward, assistant agriculturist, in charge.

J. A. Liggett, executive assistant.

*Field extension staff.*—County agent work: 33 State leaders, 20 assistant State leaders, 470 county agents. Boys' and girls' club work: 29 State leaders, 24 assistant State leaders, 16 district leaders. Farm management demonstrations: 22 State demonstrators, 73 assistant State demonstrators. Extension work with farm women: 5 State leaders, 1 assistant State leader, 17 county home demonstration agents.

### **Office of Home Economics.**

C. F. LANGWORTHY, *Chief*; R. D. MILNER, *Assistant*.

### **Studies of Food, Dietetics, Clothing, and Household Equipment, Work, and Management.**

This work includes scientific and practical studies of the nature and uses of agricultural products utilized in the home for food, clothing, and equipment, and of the methods of household work and management, and makes available to housekeepers, teachers, students, and extension workers the results of such studies and of practical experience gathered in the home and elsewhere.

### **Respiration Calorimeter Investigations.**

This work includes a systematic study by special respiration calorimetric methods of food, clothing, and household equipment and household work with particular reference to energy values and efficiency. Special respiration calorimeter investigations on other subjects included within the work of the department are carried on in cooperation with the different bureaus.

*Scientific staff.*—Helen W. Atwater, Ilena M. Bailey, S. C. Clark, W. P. Garrety, A. D. Holmes, Caroline L. Hunt, H. L. Lang, and Vera B. Spinney, assistants in investigations.

### **OFFICE OF PUBLIC ROADS AND RURAL ENGINEERING.**

*Director*, LOGAN WALLER PAGE; *Chief Engineer*, P. ST. J. WILSON; *Chief of Management*, J. E. PENNYBACKER; *General Inspectors*, T. WARREN ALLEN and E. W. JAMES.

In addition to the work comprised in the regular appropriations of the Office of Public Roads and Rural Engineering, the administration of the Federal aid road act has been intrusted by the Secretary of Agriculture to the Director of the Office of Public Roads and Rural Engineering. The organization of the office has been revised so as to meet this new responsibility through the creation of two main branches of the office, known respectively as (1) Engineering and (2) Management and Economics. The Engineering branch deals with the engineering activities of the office under both the Federal aid road act and the regular appropriations, except engineering economics. The Management and Economics branch deals with the administrative, legal, and economic work of the office under both the regular appropriations and the Federal aid road act.

The Office of Public Roads and Rural Engineering investigates systems of road management and methods of road construction and maintenance; details engineers to instruct



local officials in road building through supervising object-lesson roads; gives advice to State and county authorities on all matters relating to road construction, maintenance, and management; investigates the location, properties, and economic values of road materials; constructs experimental roads to demonstrate and test methods and materials of construction; investigates the effect of various kinds of traffic on road surfaces; studies traffic regulations; compiles statistics relating to public roads; conducts educational work through lectures, the distribution of lantern slides, and the exhibit of models; cooperates with the Forest Service on road work conducted with the proceeds of the 10 per cent appropriation from forest receipts; has charge of the survey, construction, and maintenance of roads in and adjacent to the national forests for which appropriation is made in section 8 of the Federal aid road act; conducts, under instructions from the Secretary of Agriculture, the operation of the Federal aid road act under which aid is granted to the several States in the construction of rural post roads; investigates and reports concerning the best methods of utilization of water in farm irrigation, and concerning the development of the most efficient equipment for farm irrigation; studies the duty, apportionment, and measurement of irrigation water, and the customs, regulations, and laws affecting irrigation; gives advice and assistance in farm irrigation; investigates and reports upon the drainage of farms, and of swamp and other wet lands otherwise available for agriculture; conducts field experiments and investigations in regard to construction and equipment in farm-drainage systems; gives advice and assistance in farm drainage; investigates the domestic water supply and drainage disposal of the farm; investigates and gives advice on construction of farm buildings, farm machinery, and on other rural engineering problems.

**Road Management Investigations.** J. E. PENNYBACKER, *Chief of Management, in charge.*

This work, in general, embraces engineering economics relating to the various lines of activity conducted by the office and specifically to highways; legislative investigations, the collection and compilation of statistical data, the management of the educational work which is conducted by means of lectures and exhibits, and the advisory work with reference to economics, legislation, and management. The chief of management has charge, in addition to the foregoing lines of work, of the general administrative work of the entire organization and of the administrative and legal questions arising out of the administration of the Federal aid road act.

*Scientific staff.*—M. O. Eldridge and L. E. Boykin, Assistants in Road Economics; A. P. Anderson, R. F. Eastham, H. S. Parry, H. S. Fairbank, and W. E. Rosengarten, Highway Engineers; J. J. Tobin, A. L. Luedke, and A. R. Losh, Engineer-Economists; H. W. Hendley, Model Maker.

**Road Construction and Maintenance.** P. ST. J. WILSON, *Chief Engineer*; A. E. LODER, *Assistant Chief Engineer*; V. M. PEIRCE, *Assistant Engineer*; O. L. GROVER, *Bridge Engineer.*

*Post road construction and forest road construction and maintenance.*—This work covers the construction of rural post roads in cooperation with the State highway departments and the survey, construction, and maintenance of national forests roads in cooperation with the Forest Service and the State and local authorities.

For convenience in handling the work 10 districts have been established as follows: No. 1, Washington, Oregon, Idaho; No. 2, California, Nevada, Arizona, New Mexico; No. 3, Montana, Wyoming, Utah, Colorado; No. 4, North Dakota, South Dakota, Minnesota, Wisconsin; No. 5, Nebraska, Iowa, Kansas, Missouri; No. 6, Texas, Oklahoma, Arkansas, Louisiana; No. 7, Michigan, Illinois, Indiana, Kentucky; No. 8, Tennessee, Mississippi, Alabama, Georgia, South Carolina, Florida; No. 9, Maine, New Hampshire, Massachusetts, Vermont, New Jersey, Connecticut, Rhode Island, New York, Delaware; No. 10, Ohio, Pennsylvania, Maryland, West Virginia, Virginia, North Carolina.

*Scientific staff.*—District engineers: District No. 1, L. I. Hewes; District No. 2, C. H. Sweetser; District No. 3, J. A. Whittaker; District No. 4, E. O. Hathaway; District No. 5, J. C. Wonders; District No. 6, J. D. Fauntleroy; District No. 7, J. T. Voshell; District No. 8, J. T. Bullen; District No. 9, G. H. Miller; District No. 10, H. K. Bishop.

**Road Building and Maintenance Investigations.** P. ST. J. WILSON, *Chief Engineer, in charge.*

These investigations cover the building of object-lesson roads and object-lesson bridges; the development of county road systems; making inspections and giving expert advice on road and bridge construction; the superintendence of county roads; the making of road surveys; systems of road maintenance; the maintenance of object lesson, experimental, and post roads; conducting object lessons in road maintenance; the construction of roads within the national forests, in cooperation with the Forest Service; the



preparation of typical plans for highway bridges and culverts; and experiments with bridge materials.

*Scientific staff.*—B. H. Burrell, W. F. Brooks, W. A. Crossland, O. W. Childs, B. F. Finch, B. F. Heidel, C. H. Kendall, H. H. Lotter, W. H. Lynch, C. H. Moorefield, G. C. Scales, J. F. Schuyler, W. L. Spoon, and R. E. Toms, senior highway engineers; H. K. Craig, C. C. Morris, A. E. Palen, O. N. Powell, W. H. Rhodes, jr., V. E. Towles, and M. E. Worrel, highway engineers; E. S. Alderman, J. W. Ball, F. A. Davis, A. C. Dunn, Mack Galbreath, R. H. Harrison, A. S. Hathaway, jr., A. L. Hooper, F. R. Lyons, H. S. Parry, J. T. Pauls, T. C. Petersen, P. A. Rideout, R. E. Royall, S. L. Taylor, and L. L. Winans, junior highway engineers; J. H. Dodge, J. H. Eldridge, D. G. Haire, C. T. Harrison, H. C. Wells, and D. H. Winslow, superintendents of road construction; Leonard W. Erickson, highway bridge engineer; T. L. Ainsworth, engineer draftsman; O. P. Solem, draftsman.

**Road Material Tests and Research.** PRÉVOST HUBBARD, *Chemical Engineer, in charge of Physical, Chemical, and Concrete Laboratories.*

These investigations cover the routine chemical testing and inspecting of dust preventives and road binders and materials allied to road construction; microscopic examination and classification of road-building rocks; research on properties of dust preventives and road binders; standardization of methods of testing bituminous road materials, experimental bituminous road construction and maintenance; physical testing of road-building materials; nonbituminous road material investigations; standardization of tests on nonbituminous road materials.

*Scientific staff.*—Chemical laboratories: C. S. Reeve, chemist; E. C. E. Lord, petrographer; F. P. Pritchard, B. A. Anderton, and R. H. Lewis, assistant chemists; Benjamin Kamrass, aid, qualified in chemistry. Physical laboratories: F. H. Jackson, jr., assistant testing engineer; C. E. Proudley and Raymond Harsch, laboratory assistants. Concrete investigations laboratories: A. T. Goldbeck, engineer of tests; J. R. Boyd, laboratory apprentice.

**Field Experiments.** P. ST. J. WILSON, *Chief Engineer*, and PRÉVOST HUBBARD, *Chemical Engineer, in charge of road construction*; and E. B. MCCORMICK, *Mechanical Engineer, in charge of traction tests.*

This work comprises the construction of experimental roads in cooperation with local administrative units for the purpose of demonstrating the best methods of constructing new types of roads and of studying the effect upon these roads of traffic under known conditions; investigations concerning various road materials and preparations; investigating and developing equipment intended for the preparation and application of bituminous and other binders; and the conduct of traction tests in order to determine the respective resistance of various road surfaces, and the relative values of wide and narrow tires, of different diameters of wheels, width of tread, together with the effect of grade and method of hitching on the effort that may be exerted by horses; also to determine the effect both on the draft required and on the road surface of increasing the load beyond certain limits.

*Scientific staff.*—Various members of the force of highway engineers, mechanical engineers, chemists, and student assistants in the office.

**Investigations of Rural Engineering Problems and Farm Structures.** E. B. MCCORMICK, *Mechanical Engineer, in charge.*

These investigations involve the study of the domestic water supply and disposal of sewage on the farm; recommendations and plans for farm buildings and structures involved in rural improvement, with reference to convenience and economy; research, cooperative, and experimental demonstrations of rural problems involving an expert knowledge of mechanical principles; and instrument making and repairing.

*Scientific staff.*—M. C. Betts, architect; L. L. Beebe, A. M. Daniels, and Elmer Johnson, assistant mechanical engineers; George M. Warren, hydraulic engineer; A. D. Morehouse, agricultural engineer; Wallace Ashby, barn architect; Charles Kruegl, C. D. Haynes, and F. D. Phillip, architectural draftsmen; W. R. Humphries, assistant in rural engineering.

**Irrigation Investigations.**—SAMUEL FORTIER, *Chief in charge of Irrigation Investigations.*

These investigations include the following subjects: Utilization of water in farm irrigation; pumping for irrigation; irrigation appliances and equipment; flow of water in ditches, pipes, and other conduits; measurement of water; customs, regulations, and laws relating to irrigation; drainage of irrigated lands; expert advice and assistance.

*Scientific staff.*—R. P. Teele, irrigation economist; Paul A. Ewing and Wells A. Hutchins, assistants in irrigation economics; Frank Huntington, editorial clerk; Frank

Adams, W. L. Rockwell, irrigation managers; S. H. Beckett, F. L. Bixby, V. M. Cone, H. C. Diesem, P. E. Fuller, H. W. Grunsky, C. G. Haskell, F. G. Harden, J. T. Kingdon, W. W. McLaughlin, R. D. Robertson, Fred C. Scobey, F. W. Stanley, C. E. Tait, Milo B. Williams, irrigation engineers; James C. Marr, Reuben B. Sleight, Frank J. Viehmeyer, M. I. Lewis, R. L. Parshall, F. H. McCarthy, and Carl Rober, assistant irrigation engineers; R. A. Hart, W. W. Weir, senior drainage engineers; W. G. Sloan, drainage engineer; D. W. Bloodgood, G. S. Knapp, L. M. Winsor, agents; E. J. Hoff, mechanician; R. G. Hemphill, John H. Gordon, irrigation farmers.

**Drainage Investigations.** S. H. McCrory, *Chief in charge of Drainage Investigations.*

These investigations embrace the following subjects: Methods of removing surplus water from lands having agricultural value; protection of lands from periodical overflow of streams; reclamation of tidal lands; control and conservation of rainfall on hillside lands; construction and maintenance of farm drainage works; equipment for use in constructing and maintaining farm drainage works; and costs and methods of organizing and financing community drainage projects.

*Scientific staff.*—H. H. Barrows, O. G. Baxter, George R. Boyd, F. G. Eason, J. R. Haswell, L. A. Jones, R. D. Marsden, D. G. Miller, J. V. Phillips, P. T. Simons, D. L. Yarnell, senior drainage engineers; S. W. Frescoln, W. N. Hall, W. A. Kelly, H. M. Lynde, C. E. Ramser, F. F. Shafer, drainage engineers; Quincy C. Ayres, E. W. Grimmer, Guy A. Hart, D. C. Helmick, L. T. Jessup, Charles Kirschner, Charles Levy, F. E. Staebner, junior drainage engineers; H. S. Yohe, expert on drainage organization.

**OFFICE OF MARKETS AND RURAL ORGANIZATION.**

*Chief,* CHARLES J. BRAND; *Assistant Chief,* HERBERT C. MARSHALL; *Chief Clerk,* C. H. WALLEIGH; *Administrative Assistant,* R. V. BAILEY; *Librarian,* CAROLINE B. SHERMAN.

The studies of the Office of Markets and Rural Organization cover market conditions, demands for specific crops, sources of supply, methods of grading, standardizing, packing and shipping, and the nature of the commercial transactions by means of which farm produce moves from the farm to the consumer; waste in marketing; profits in handling farm products, with means for the reduction of those which are excessive; and co-operative associations of farmers for handling rural problems. An outgrowth of the studies is the demonstration market news service now conducted for certain fruits and vegetables. Under authority conferred by the United States cotton futures act such data are collected as may be necessary to determine what markets are bona fide spot markets, and necessary activities are conducted in order to prescribe rules and regulations, establish and promulgate standards for cotton, and furnish practical forms thereof to the trade. When disputes arise between the person delivering cotton and the person receiving the same in the settlement of future contracts, questions of grade, length of staple, and quality are determined by the Office of Markets and Rural Organization under the authority of the Secretary. In conjunction with the Bureau of Plant Industry the office is charged with the administration of the United States grain standards act and is developing the projects necessary for its effective enforcement. The office is also charged with the administration of the warehouse act.

**Cotton Handling and Marketing.** FRED TAYLOR, *Cotton Technologist.*

This work includes the investigation of the commercial processes involved in handling, marketing, and utilizing cotton in order to make recommendations as to improvements and economies; the conduct of investigational work in the organizing of communities of cotton growers to market their product and experiments regarding the advantage of growing cotton from pure seed in these communities. Studies are made to determine the value to growers of grading cotton before sale, the relative commercial value of pure-bred varieties, and the percentage of moisture in cotton, and primary market surveys are undertaken to determine the quality and variety and range of price of both long and short staple cottons.

*Scientific staff.*—D. C. Griffith, investigator in cotton marketing; C. F. Creswell, scientific assistant; O. J. McConnell, J. H. Higginbotham, and A. D. Hudson, assistants in cotton marketing; C. H. Carpenter, T. R. Marshall, and N. P. Sims, agents.

**Cooperative Purchasing and Marketing.** CHARLES E. BASSETT, *Specialist in Cooperative Organization.*

Under this project a study is made of the methods of organizing and operating co-operative marketing and purchasing associations, in order to form the basis of further investigations and to facilitate the most effective distribution of information and assistance. Specimen articles of incorporation, constitutions, and by-laws have been collected for the different kinds of marketing and purchasing organizations, and, where advisable, assistance is given to groups intending to organize.

*Scientific staff.*—J. C. Skinner, investigator in cooperative marketing; O. B. Jesness, assistant in cooperative organization.

**Market Surveys, Methods, and Costs.** WELLS A. SHERMAN, *Specialist in Market Surveys.*

Surveys are made to determine supplies available for market, rate of movement, outlets, and prices of specific products by definite trade areas. Questions of supply and demand for certain crops in specific markets are being studied, as is the relation of prices to market receipts and of consumption to prices. Methods of wholesale and retail distribution are being investigated, and a systematic study of the causes underlying price fluctuation has been planned.

*Scientific staff.*—J. H. Collins, Paul Froehlich, and L. H. Martin, assistants in market surveys; and Faith L. Yeaw market station assistant.

**Market Grades and Standards.** C. T. MORE, *Investigator in Market Grades and Standards*, and M. W. SCOTT, *Specialist in Fruit Grading and Standardization.*

National uniformity in market grades, standards, weights, measures, packages, containers, and trade names is the object of this project. It involves a careful study of present methods of handling, grading, and packing perishable products and shipping packages used, in order to educate and encourage growers and shippers, as the first step in marketing, to prepare their crops properly for shipment and sale. The elimination of present wastes and losses attending the marketing of perishables is sought.

*Scientific staff.*—Hartley E. Truax, scientific assistant in marketing and distribution; Harry C. Hetzel, assistant in market surveys.

**City Marketing and Distribution.** G. V. BRANCH, *Investigator in City Marketing.*

Investigations under this head are carried on in many of the larger cities of the country. In studying the problems involved in the provisioning of urban populations with perishable foodstuffs, the possibilities of more direct, efficient, and satisfactory dealing through the medium of wholesale and retail public markets and wholesale terminal markets of various types are being investigated. The advantages of various other methods of city distribution are being studied and designs and estimates of the cost of model but economical market structures fully equipped with modern facilities for the efficient and sanitary handling of good products are made. When local conditions warrant, upon request of responsible organizations in cities, marketing surveys are made and suggestions and general information given regarding possible improvements.

*Scientific staff.*—R. McC. Beanfield, structural engineer; Achsah Lippincott, assistant in city marketing investigations.

**Transportation and Storage.** G. C. WHITE, *Specialist in charge of Transportation.*

In this section problems involved in the transportation and storage of farm products are investigated; remedies are sought to overcome car shortages; the operation of special market trains and the development of freight service by interurban electric lines are encouraged; the greater needs of producers and distributors are called to the attention of carriers; producers are being impressed with their joint responsibility with carriers in the safe transportation of their products to consumers; and shippers and carriers are assisted in methods of greater efficiency to reduce the present economic waste of foodstuffs in transit. Studies are made of the amount and location of all available public cold-storage space in the United States; data are being secured relative to the quantity and kinds of perishable foodstuffs held in cold storage, the length of time they are held, and the effect of such holding upon retail prices. Monthly reports of the holdings of apples, butter, cheese, and eggs are issued.

*Scientific staff.*—T. F. Powell, specialist in transportation; E. R. Gassman, assistant in transportation; and I. C. Franklin, specialist in storage.

**Marketing by Parcel Post and Express.** LEWIS B. FLOHR, *Investigator in Marketing by Parcel Post.*

Experiments are being made to determine to what extent the parcel post and the services of the commercial express companies may be utilized profitably in marketing farm and nonmanufactured food products, especially in conveying them from producer to consumer direct. Various types and makes of containers are being used in making experimental shipments of nearly all classes of farm products, including extensive shipments of butter, eggs, fruits, and vegetables. Systems for bringing rural producers and urban consumers into contact and for establishing their business relationships upon a proper basis are being worked out.

*Scientific staff.*—John W. Law and C. C. Hawbaker, assistants in marketing by parcel post.



**Marketing Live Stock, Meats, and Animal By-Products.** LOUIS D. HALL, *Specialist in Marketing Live Stock and Meats.*

A thorough study of existing live-stock markets and systems of marketing is in progress, including transportation facilities and agencies for the distribution of live stock and meats. This involves an investigation of methods and costs of marketing live stock and meats through centralized markets and local agencies; a compilation of information relative to the centralized markets, their capacity, equipment, and characteristics, including a study of market classes and grades at the different points; and the collection and distribution of information relative to current market supplies and prices of live stock and meats.

*Scientific staff.*—F. M. Simpson, S. W. Doty, W. V. Smith, and C. V. Whalin, assistants in marketing live stock and meat; Turner Wright, field assistant in marketing investigations; C. A. Burmeister, scientific assistant in marketing live stock and meats; Lawrence Foot, agent.

**Market Business Practice.** W. H. KERR, *Investigator in Market Business Practice.*

The object of this work is to investigate the business practices of cooperative and farmers' marketing, distributing, purchasing, and rural business organizations and other marketing agencies, with special reference to their accounting systems and methods of auditing, business organization and financing, and to devise suitable accounting systems for these organizations and agencies, for the purpose of increasing their efficiency.

*Scientific staff.*—J. R. Humphrey, investigator in market business practice; G. A. Nahstoll, W. W. Wright, W. J. Fisher, F. W. Eckert, B. B. Mason, assistants in market business practice; J. H. Conn, field agent in market business practice, State of Washington; Frank Robotka, field agent in market business practice, State of Minnesota; J. A. Bexell, collaborator, Corvallis, Ore.

**Grain, Seed, and Hay Marketing Investigations.** GEORGE LIVINGSTON, *Specialist in Grain Marketing*, and WILLIAM A. WHEELER, *Specialist in Marketing Seeds.*

A detailed economic study of primary and terminal marketing of grain, seed, and hay, together with their sale to the consuming public, is now in progress. This study, which includes cost of marketing, storage, warehouse practices, mixing, scalping, future trading, and other phases of the subject, is being made in order to obtain information useful to the various agencies engaged in the marketing and distributing of grain, seed, and hay, and for the purpose of offering constructive suggestions for the improvement of the service.

*Scientific staff.*—K. B. Seeds, specialist in grain marketing; Earl Chenault, assistant in grain marketing; G. C. Edler, investigator in marketing seeds; A. R. Evans, assistant in seed marketing; and L. D. H. Weld, collaborator.

**Marketing Cotton Seed and its Products.** ———, *Specialist in Marketing Cotton Seed.*

In this work investigations are made of present methods of handling, marketing, and utilizing cotton seed and its products, with a view to suggesting means whereby improvements may be made and economies effected, and studies are conducted regarding the establishment of standard grades and the standardization of conditions under which cotton seed and its products are handled and stored. Special attention is given to the consideration of moisture content as a factor in grading.

**Marketing Dairy Products.** ROY C. POTTS, *Specialist in Marketing Dairy Products.*

In this work a study of marketing dairy products and dairy substitutes is conducted, including methods and costs of their preparation for market, market grades and classification of dairy products, market quotations and quotation systems, selling agreements, marketing facilities and methods, market requirements and conditions, and related subjects, in order to suggest measures by which market conditions and marketing methods may be improved and the costs of marketing dairy products reduced.

*Scientific staff.*—G. P. Warber and Herman F. Meyer, assistants in marketing dairy products; Leon M. Davis, assistant in marketing farm products; W. A. Stocking, jr., collaborator.

**Cotton Warehouse Investigations.** R. L. NIXON, *Assistant in Warehouse Investigations.*

The purpose of this work is the accumulation and dissemination of useful information relating to the warehousing of cotton, insurance rates while in storage, and benefits, including better arrangements for financing, to be derived from conserving cotton in storage houses; the construction of different types of warehouses; and the relation of present methods and practices of compressing cotton to warehousing.

*Scientific staff.*—Roy L. Newton and Charles M. Flanagan, assistants in warehouse investigations.



**Collecting and Distributing Market Information.** WELLS A. SHERMAN, *Specialist in Market Surveys.*

This project is at present conducting a telegraphic market news service covering the commercial movement and prevailing market prices of the principal fruit and vegetable crops. Branch offices have been established in the principal metropolitan markets, and these, in connection with temporary offices located in producing territory during crop movement, act as centers for the distribution of all available information. The information which is made public includes reports from all important markets covering receipts, market conditions, and prevailing wholesale prices; telegraphic advices from railroad officials in all parts of the country giving shipments of the commodities which are being reported; and f. o. b. information furnished by field men in shipping areas. During the major portion of the year daily bulletins are issued from the permanent city offices and from the various temporary offices in commercial producing territory.

*Scientific staff.*—H. R. Bergh, H. J. Clay, C. R. Dorland, C. W. Dunning, G. E. Engels, J. W. Fisher, jr., A. D. Gail, jr., J. C. Gilbert, P. C. Isbell, J. P. Klein, J. W. Park, R. M. Peterson, F. W. Read, C. R. Runyon, O. W. Schleussner, R. H. Shoemaker, Julius Smith, M. M. Stewart, and W. B. Walker, assistants in market surveys; R. D. Bailey, E. D. Baker, H. P. Henry, and H. F. Walker, scientific assistants; M. S. Wiggins, field assistant in marketing investigations; J. J. Ahearn, E. R. Biddle, T. C. Bushfield, H. A. Harris, F. R. Keebler, C. W. Kitchen, R. S. Lumbard, O. J. MacDonald, E. F. MacGowan, H. E. Munger, A. E. Prugh, P. J. Roach, A. G. Roberts, Nathan Ruderman, E. M. Seifert, and Lucy Watt, market station assistants.

**State Cooperation in Marketing.** W. H. KERR, *Investigator in Market Business Practice.*

The object of this work is to carry on in cooperation with the various State agricultural colleges and departments of agriculture investigational and demonstrational work in connection with the marketing and distributing of farm products. Field agents in marketing are located in each of the cooperating States, such agents having charge of the marketing investigations and demonstrations conducted within that State.

*Scientific staff.*—Arkansas, ———; Colorado, Jesse L. Taylor; Georgia, M. C. Gay; Kentucky, John U. Field; Louisiana, Turner Wright; Michigan, R. H. Elsworth; Minnesota, Frank Robotka; Montana, W. L. Beers; Nebraska, H. C. Filley; New Mexico, ———; North Dakota, J. E. Boyle; Oregon, Hector Macpherson and G. Lansing Hurd; South Carolina, F. W. Hofmann; Tennessee, W. A. Schoenfeld; Vermont, M. R. Tolstrup; Virginia, Ben C. Moomaw, jr.

**Foreign Markets Investigations.** CLARENCE W. MOOMAW, *Specialist in Foreign Markets investigations.*

The purpose of this work is to conduct general investigations in foreign marketing for all agricultural products as to sources of supply for countries importing farm and nonmanufactured food products, quantity consumed and the consumptive demand, trade formalities, customs, requirements, and practices, and general business conditions which affect the marketing and distribution of such products, and the influence of foreign crop and market conditions upon the marketing and distributing of products of the United States.

**Miscellaneous Problems in Marketing and Cooperation.**

Under this project study is made of new lines of work relating to the organization of rural communities, and the preparation, handling, preservation, and marketing of animal, food, and miscellaneous products not specifically provided for under other projects; and cooperation with those governmental agencies already conducting investigations in the marketing of specific products is provided for.

**Investigations and Demonstrations of Cotton Standards.** FRED TAYLOR, *Cotton Technologist.*

Under this head are made field and laboratory investigations and demonstrations of standards for the different grades, qualities, and conditions of cotton. Investigations are carried on regarding the ginning, grading, stapling, baling, marketing, compressing, and tare of cotton. Studies are made relative to standardizing Arizona-Egyptian cotton, the length of staple of cotton, cotton representing perished staple, immature staple, and of gin-cut cotton, reginned cotton, and cotton linters. When practicable, grading experts demonstrate proper methods to communities of cotton growers in order to secure more uniform grading in spot cotton transactions, and to show to these communities the advantages of proper grading and classification of cotton before sale. To the end that cotton quotations may be on a more uniform basis, grading and standardization demonstrations are to be conducted in certain spot markets.

**Cotton Testing.** FRED TAYLOR, *Cotton Technologist.*

Under this project tests are made of the waste, tensile strength, and bleaching qualities of the different grades, classes, and varieties of cotton in order to determine their commercial and spinning values. Spinning tests are being conducted on the basis of the official cotton standards of the United States, representing cotton of Upland, Texas, and Gulf growths, with staple approximately fifteen-sixteenths of an inch long, purchased from representative sections of the cotton belt, and the tentative grades of Arizona-Egyptian cotton grown in the Salt River Valley are being tested.

*Scientific staff.*—W. S. Dean, assistant in cotton testing; C. E. Coburn, R. V. Hellams, and C. E. Killingsworth, assistants in agricultural technology.

**Rural Credit, Insurance, and Communication.** C. W. THOMPSON, *Specialist in Rural Organization.*

This work consists of the investigation and the encouragement of organization in rural communities for the purpose of obtaining better credit, insurance, and communication facilities. This includes a study of the conditions under which farmers obtain loans or credit; a study of successful organization performing the functions of rural credit banks; the promotion of organized activity among farmers for credit improvement; the elimination of disastrous losses to farmers by the encouragement of cooperative effort in providing proper insurance facilities and in safeguarding the property against loss; and the study of various methods of securing rural telephone service and the encouragement of cooperation for this purpose.

*Scientific staff.*—V. N. Valgren, investigator in agricultural insurance; Leon E. Truesdell, field assistant in rural organization; A. E. Cance, Amherst, Mass., and W. O. Hedrick, East Lansing, Mich., collaborators.

**Rural Social and Educational Activities.** C. W. THOMPSON, *Specialist in Rural Organization.*

The object of this work is the improvement of social and educational conditions in rural communities by the accumulation and dissemination of useful information growing out of a study of the social and educational needs of typical communities; the work of their existing forms of organization, and the possibilities for improvement through organized activity; the investigation of methods of encouraging social organization activities; and the study of means of improving social, economic, and educational conditions of women and children through the work of women's rural organizations.

*Scientific staff.*—J. Sterling Moran, field assistant in rural organization; Anne M. Evans, investigator in women's rural organizations; Wayne C. Nason, assistant in rural organization; E. C. Branson, Chapel Hill, N. C., and Paul L. Vogt, State university, Columbus, Ohio, collaborators.

**Administration of the United States Cotton Futures Act.** CHARLES J. BRAND, *Chief, Office of Markets and Rural Organization.*

Supervision and direction of the investigational and regulatory activities of the Office of Markets and Rural Organization in connection with the enforcement of the United States cotton futures act and the rules and regulations of the Secretary of Agriculture thereunder, and such executive and clerical duties as may be necessary in connection therewith are carried on under this project.

*Scientific staff.*—Charles J. Brand, George R. Argo, Fred Taylor, R. L. Francis, D. E. Earle, D. C. Griffith, H. C. Slade, W. H. Deaver, Hal Brown, J. G. Martin, O. J. McConnell, A. M. Agelasto, and W. S. Dean, board of examiners; Fred Taylor, R. L. Francis, D. E. Earle, D. C. Griffith, H. C. Slade, W. H. Deaver, Hal Brown, O. J. McConnell, W. S. Dean, A. M. Agelasto, and R. L. Kaue, committee on final inspection; John F. Barghausen, mechanical assistant.

**Determination of Disputes Under the United States Cotton Futures Act.** GEORGE R. ARGO, *Assistant in Cotton Business Methods.*

The object of this work is to hear and determine disputes as to the classification of cotton tendered in settlement of future contracts made in compliance with sections 5 and 6A of the cotton futures act referred to the Secretary of Agriculture under the terms of the act, and to prepare Secretary's findings in cases of dispute.

*Scientific staff.*—R. L. Francis, specialist in cotton classing; H. C. Slade, assistant in cotton marketing; W. H. Deaver and A. M. Agelasto, specialists in cotton classing; Wm. R. Cochran, assistant in cotton business methods; R. A. Freret, assistant in cotton marketing.

**Investigations of Future and Spot Markets for Cotton under the United States Cotton Futures Act.** GEORGE R. ARGO and WM. R. COCHRAN, *Assistants in Cotton Business Methods.*

Under this head investigations are made of future markets for cotton to ascertain how accurately their future quotations reflect spot values, and to secure general information

as to conditions within the future exchanges; markets are studied to determine their fitness for designation as bona fide spot markets; reliable quotations are secured daily from each of the designated spot markets; and the markets are inspected from time to time to see that they conform to the necessary conditions.

*Scientific staff.*—R. Kohlheim, assistant in cotton classing.

**Preparation and Distribution of the Official Cotton Standards of the United States Under the United States Cotton Futures Act.** FRED TAYLOR, *Cotton Technologist*.

In this section is done the work of preparing and distributing the official cotton standards of the United States, promulgated by the Secretary of Agriculture on December 15, 1914, under section 9 of the United States cotton futures act; of inspecting and condemning these standards when necessary; and replacing them upon request.

*Scientific staff.*—D. E. Earle, specialist in cotton classing; C. E. Atkinson, assistant in cotton marketing; R. L. Kause, M. L. Rice, G. P. Taylor, A. D. Jones, and G. S. Anderson, assistants in cotton classing; T. C. Adams, assistant in agricultural technology.

**Administration of the United States Grain Standards Act.** CHARLES J. BRAND, *Chief, Office of Markets and Rural Organization*.

Supervision and direction of the investigational and regulatory activities involved in the enforcement of the United States grain standards act, the rules and regulations of the Secretary of Agriculture thereunder and such executive and clerical duties as may be necessary in connection therewith are carried on under this project.

*Assignment.*—Charles J. Brand and W. A. Taylor; advisory committee, J. W. T. Duvel, chairman, George Livingston, and chief supervisor ———.

**Investigation and Determination of Grain Standards.** J. W. T. DUVEL, *Crop Technologist*.

Investigations are made of such phases of harvesting, handling, transportation, storage, and grading of grain as contribute information fundamental and necessary for establishing, fixing, and perfecting standards for corn, wheat, rye, oats, barley, grain sorghums, flaxseed, and such other grains as the usages of the trade may warrant and justify; investigations are made of the relations of grades and standards to the feeding and manufacturing value of sound and unsound grain; also of the influence on grade of biophysical, biochemical, and physiological changes which take place in grain during harvesting, transportation, and storage. Laboratory methods for determining the condition and quality of grain are developed and perfected; also special apparatus for use in grain grading.

*Scientific staff.*—H. J. Besley, E. G. Boerner, C. L. Cannon, W. P. Carroll, J. H. Cox, R. C. Miller, and C. A. Russell, supervisors in grain inspection.

**Grain Handling and Transportation Investigations.** J. W. T. DUVEL, *Crop Technologist*, and GEORGE LIVINGSTON, *Specialist in Grain Marketing*.

Investigations of general and specific commercial problems connected with the handling, transportation, and storage of grain are conducted, including methods employed on the farm, at the country elevator, and at distributing and consuming centers; the effect of commercial practices on the commercial value of grain; the relation of transportation facilities to economic and efficient marketing and distribution of grain in domestic and foreign commerce; the construction and equipment of elevators and warehouses and of such other related subjects as may furnish information useful to the various agencies engaged in the handling, transportation, storage, and merchandizing of grain.

*Scientific staff.*—E. G. Boerner, J. H. Cox, Laurel Duval, L. M. Jeffers, R. C. Miller, Philip Rothrock, and C. A. Russell, supervisors in grain inspection; Earl Chenault, assistant in grain marketing; and A. R. Evans, assistant in seed marketing.

**Licensing of Inspectors.** CHARLES J. BRAND, *Chief, Office of Markets and Rural Organization*.

The object of this work is to determine the competence of persons applying for license under the United States grain standards act and to issue to qualified persons licenses for inspecting and grading grain and certifying the grade thereof and to suspend or revoke licenses in accordance with the provisions of the act.

*Scientific staff.*—Karl B. Seeds, specialist in grain marketing.

**Supervision of Inspection.** CHARLES J. BRAND, *Chief, Office of Markets and Rural Organization*.

Supervision and inspection of grain will be conducted in order to secure the accurate application of the official grain standards of the United States. Rules and regulations covering the inspection of grain not inspected by a licensed inspector at the point of origin, but to be inspected in transit or at destination have been prepared and are being enforced. Investigations of licenses and recommendations thereto are being made.



Reports are collected and other work conducted in connection with the inspection of grain.

*Scientific staff.*—P. J. Brittain, specialist in grain exchange practice; C. B. Barron, E. G. Boerner, C. L. Cannon, W. P. Carroll, J. H. Cox, Laurel Duval, H. H. Gear, C. F. Hegwein, L. M. Jeffers, R. T. Miles, E. L. Morris, C. E. Munn, V. L. Nigh, Philip Rothrock, C. A. Russell, John Sheedy, B. J. Stubblefield, L. M. Thomas, F. B. Tompkins, E. N. Warner, supervisors in grain inspection; and R. C. Mill and C. B. Wright, assistant supervisors in grain inspection.

**Determination of Disputes and Appeals.** CHARLES J. BRAND, *Chief, Office of Markets and Rural Organization.*

The disputes and appeals which may be referred to the Secretary of Agriculture regarding grade and quality of grain are determined and findings in each case are prepared and signed. Rules and regulations have been prepared defining the procedure to be followed in referring disputes and appeals to the Secretary of Agriculture.

*Scientific staff.*—P. J. Brittain, specialist in grain exchange practice; C. B. Barron, E. G. Boerner, C. L. Cannon, W. P. Carroll, J. H. Cox, Laurel Duval, H. H. Gear, C. F. Hegwein, L. M. Jeffers, R. T. Miles, E. L. Morris, C. E. Munn, V. L. Nigh, Philip Rothrock, C. A. Russell, John Sheedy, B. J. Stubblefield, L. M. Thomas, F. B. Tompkins, E. N. Warner, supervisors in grain inspection; and R. C. Mill and C. B. Wright, assistant supervisors in grain inspection.

**Enforcement of the United States Warehouse Act.** CHARLES J. BRAND, *Chief, Office of Markets and Rural Organization.*

The purpose of this work is to inspect and classify warehouses applying for licenses under the United States warehouse act; to license warehouses that are found to be suitable for the proper storage of cotton, grains, flaxseed, wool, and tobacco; to license weighers and graders for the purpose of weighing and grading agricultural products to be stored in warehouses licensed under this act; to license any person not a warehouseman to accept custody of cotton, grains, flaxseed, wool, and tobacco, and to store same in a warehouse owned or operated by any State; to prescribe the duties of warehousemen licensed by the Secretary of Agriculture, to make rules and regulations for carrying out the provisions of the United States warehouse act, and to prescribe the conditions of the bond required of licensed warehousemen; to investigate the storage, warehousing, classifying, according to grade or otherwise, weighing and certification of cotton, grains, flaxseed, wool, and tobacco; to establish and promulgate standards for agricultural products by which their quality or value may be judged or determined; and to make such other investigations as may be necessary for carrying out the provisions of the United States warehouse act.

*Scientific staff.*—R. L. Nixon, assistant in warehouse investigations.

## BOARDS AND COMMITTEES.

### Insecticide and Fungicide Board.

The Insecticide and Fungicide Board, created December 22, 1910, assists the Secretary of Agriculture in the enforcement of the insecticide act of 1910.

*Members.*—J. K. Haywood, chairman; M. B. Waite, A. L. Quaintance, and James A. Emery; executive officer, J. G. Shibley.

### Federal Horticultural Board.

The Federal Horticultural Board, created August 21, 1912, assists the Secretary of Agriculture in the enforcement of the plant quarantine act of August 20, 1912.

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AGRICULTURAL COLLEGES AND EXPERIMENT  
STATIONS.

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## KEY TO ABBREVIATIONS.

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<i>Acct.</i> , Accountant, Accounts.	<i>Husb.</i> , Husbandry Husbandman.
<i>Actg.</i> , Acting.	<i>Hyg.</i> , Hygiene.
( <i>Actg.</i> ), Acting Professor.	<i>Indus.</i> , Industry, Industrial, Industries.
( <i>Adjunct</i> ), Adjunct Professor.	<i>Inorg.</i> , Inorganic.
<i>Agr.</i> , Agriculture, Agriculturist, Agricultural.	<i>Insp.</i> , Inspection, Inspector.
<i>Agron.</i> , Agronomy, Agronomist.	<i>Instr.</i> , Instruction, Instructor.
<i>Agt.</i> , Agent.	<i>Insts.</i> , Institutes.
<i>An.</i> , Animal.	<i>Invest.</i> , Investigations, Investigator, Investigational.
<i>Anal.</i> , Analytical, Analysis.	<i>Irrig.</i> , Irrigation, Irrigationist.
<i>Anat.</i> , Anatomy.	<i>Lab.</i> , Laboratory.
<i>Arch.</i> , Architecture.	<i>Landsc.</i> , Landscape.
<i>Assoc.</i> , Associate.	<i>Lect.</i> , Lecturer.
( <i>Assoc.</i> ), Associate Professor.	<i>Libr.</i> , Library, Librarian.
<i>Asst.</i> , Assistant.	<i>Mach.</i> , Machine, Machinery.
( <i>Asst.</i> ), Assistant Professor.	<i>Mech.</i> , Mechanics, Mechanical.
<i>Bact.</i> , Bacteriology, Bacteriologist.	<i>Met.</i> , Meteorology, Meteorologist.
<i>Biol.</i> , Biology, Biologist, Biological.	<i>Mfrs.</i> , Manufacturers.
<i>Bot.</i> , Botany, Botanist, Botanical.	<i>Mgr.</i> , Manager.
<i>Brdg.</i> , Breeding.	<i>Mgt.</i> , Management.
<i>Chair.</i> , Chairman.	<i>Mycol.</i> , Mycology, Mycologist, Mycological.
<i>Chem.</i> , Chemistry, Chemist, Chemical.	<i>Nat.</i> , Natural.
<i>Climat.</i> , Climatology, Climatologist.	<i>Nutr.</i> , Nutrition.
<i>Coll.</i> , College.	<i>Oler.</i> , Olericulture, Olericulturist.
<i>Comp.</i> , Comparative.	<i>Org.</i> , Organic.
<i>Comr.</i> , Commissioner.	<i>Ornith.</i> , Ornithology, Ornithologist.
<i>Consult.</i> , Consulting.	<i>Parasitol.</i> , Parasitology, Parasitologist.
<i>Coop.</i> , Cooperation, Cooperative, Cooperator.	<i>Path.</i> , Pathology, Pathologist, Pathological.
<i>Corresp.</i> , Correspondence, Correspondent.	<i>Pedag.</i> , Pedagogy, Pedagogics.
<i>Dem.</i> , Demonstration, Demonstrator.	<i>Pharm.</i> , Pharmacy, Pharmacist, Pharmaceutical.
<i>Dept.</i> , Department.	<i>Photog.</i> , Photography, Photographer.
<i>Dir.</i> , Director.	<i>Phys.</i> , Physics, Physicist, Physical.
<i>Dist.</i> , District.	<i>Physiol.</i> , Physiology, Physiologist, Physiological.
<i>Distrib.</i> , Distribution.	<i>Pomol.</i> , Pomology, Pomologist, Pomological.
<i>Div.</i> , Division.	<i>Pract.</i> , Practice, Practical.
<i>Dom.</i> , Domestic.	<i>Prep.</i> , Preparatory.
<i>Econ.</i> , Economy, Economic, Economics.	<i>Pres.</i> , President.
<i>Ed.</i> , Education.	<i>Prin.</i> , Principal.
<i>Ele.</i> , Elementary.	<i>Prod.</i> , Production, Products.
<i>Engin.</i> , Engineer, Engineering.	<i>Professor</i> , shown by giving subject only, as
<i>Ent.</i> , Entomology, Entomologist, Entomological.	<i>Agron.</i> , i. e., professor of agronomy.
<i>Erad.</i> , Eradication.	<i>Sci.</i> , Science, Scientific.
<i>Expt.</i> , Experiment, Experimentalist, Experimental.	<i>Sec.</i> , Secretary.
<i>Ext.</i> , Extension.	<i>Secon.</i> , Secondary.
( <i>Ext.</i> ), Extension Professor.	<i>Sociol.</i> , Sociology.
( <i>Ext. Assoc.</i> ), Extension Associate Professor.	<i>Sta.</i> , Station.
( <i>Ext. Asst.</i> ), Extension Assistant Professor.	<i>Substa.</i> , Substation.
<i>Feed.</i> , Feeding.	<i>Supt.</i> , Superintendent.
<i>Fert.</i> , Fertility, Fertilizer.	<i>Surg.</i> , Surgery.
<i>Flor.</i> , Floriculture, Floriculturist, Floricultural.	<i>Tech.</i> , Technology, Technologist, Technical.
<i>For.</i> , Forestry.	<i>Treas.</i> , Treasurer.
<i>Gard.</i> , Gardening.	<i>Trop.</i> , Tropical.
<i>Gen.</i> , General.	<i>Univ.</i> , University.
<i>Geol.</i> , Geology, Geologist, Geological.	<i>Veg.</i> , Vegetable, Vegetation.
<i>Grad.</i> , Graduate.	<i>Vet.</i> , Veterinary, Veterinarian.
<i>Histol.</i> , Histology, Histologist.	<i>Vit.</i> , Viticulture, Viticulturist, Viticultural.
<i>Hort.</i> , Horticulture, Horticulturist, Horticultural.	<i>Voc.</i> , Vocational.
	<i>Zool.</i> , Zoology, Zoologist, Zoological.



# AGRICULTURAL COLLEGES AND EXPERIMENT STATIONS.<sup>1</sup>

(Prepared in the States Relations Service,

A. C. TRUE, *Director.*)

## ALABAMA.

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\*College faculty. †Station staff. ‡Extension staff.

\*C. C. Thach, A. M., LL. D., *President.*

\*††J. F. Duggar, M. S., *Dir. of Sta. Dir. Ext. Work. Agron.*(\*†)

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| *†J. T. Anderson, Ph. D., <i>Chem., Soil and Crop Invest.</i>  | *†M. J. Funchess, M. S., ( <i>Assoc.</i> ) <i>Agron.; Assoc. Agron.</i>      |
| *P. F. Bahnsen, V. S., <i>Lect. Phys. Diagnostics.</i>   | †Ernest Gibbens, B. S., <i>Asst. in Beef Husb. (Allenville).</i>             |
| *††R. U. Blasingame, M. S., <i>Agr. Engin.</i>   | *†C. L. Hare, M. S., <i>Physiol. Chem.</i>                                   |
| ††F. E. Boyd, M. S., <i>Asst. Agron. (Coop. U. S. D. A.).</i>  | †A. E. Hayes, B. S., <i>Asst. in Swine Husb. (Allenville).</i>               |
| *Thomas Bragg, M. S., ( <i>Assoc.</i> ) <i>Chem.</i>   | *†‡W. E. Hinds, Ph. D., <i>Ent.</i>  |
| †D. J. Burleson, M. S., <i>Ext. Agron.</i>   | †‡O. L. Howell, M. S., <i>Asst. Agron.</i>                                   |
| *†C. A. Cary, B. S., D. V. M., <i>Physiol., Vet. Sci., Dean Vet. Med. and Surg.; Vet. (State Vet.). Dir. Farmers' Insts.</i> | *J. B. Jackson, M. S., <i>Asst. Chem.</i>                                    |
| †E. F. Cauthen, B. S., <i>Assoc. Agron., Recorder.</i>   | †I. B. Kerlin, <i>Asst. Boys' Club Agt. (Coop. U. S. D. A.).</i>             |
| *T. W. Clift, B. S., <i>Asst. Chem.</i>  | *I. S. McAdory, B. S., D. V. M., ( <i>Asst.</i> ) <i>Vet. Sci.</i>           |
| †P. O. Davis, B. S., <i>Hort. Field Agt.</i>   | *G. H. Marsh, M. S., <i>Instr. Chem.</i>                                     |
| *†L. N. Duncan, M. S., <i>School Agr. Supt. of Junior and Home Econ. Ext. Work. (State Club Agt.)</i>                        | *H. M. Martin, M. S., <i>Asst. Chem.</i>                                     |
| †Mary Feminear, B. S., <i>Asst. State Agt. Home Dem. Poultry Work.</i>   | *†A. B. Massey, B. S., ( <i>Asst.</i> ) <i>Bot.; Asst. Bot.</i>              |
| *C. W. Ferguson, D. V. M., M. D. C., <i>Instr. Vet. Med.</i>   | *E. T. Motley, M. S., <i>Asst. Chem.</i>                                     |
| *†H. C. Ferguson, B. S., ( <i>Assoc.</i> ) <i>An. Husb.; Assoc. An. Husb.</i>  | †Mary G. Paxton, B. S., <i>Asst. State Agt. Home Dem. Work (Montevallo).</i> |
| †C. G. Filler, B. S., <i>Beef Cattle Expert (Coop. U. S. D. A.).</i>   | †G. L. Peltier, Ph. D., <i>Plant Path.</i>                                   |
| †J. C. Ford, M. S., <i>Pig Club Agt. (Coop. U. S. D. A.).</i>  | *P. P. Powell, M. S., ( <i>Asst.</i> ) <i>Chem.</i>                          |
|  | *†J. C. Price, B. S., ( <i>Assoc.</i> ) <i>Hort.; Assoc. Hort.</i>           |
|  | †J. P. Quinerly, B. S., <i>Dairy Cattle Ext. (Coop. U. S. D. A.).</i>        |
|  | †Madge J. Reese, B. S., <i>State Agt. Home Dem. Work.</i>                    |
|  | *†W. J. Robbins, Ph. D., <i>Bot.</i>   |

<sup>1</sup> These lists were compiled by Mary A. Agnew and Althea E. Thacker, of the States Relations Service, and are intended to replace the "Organization Lists of the Agricultural Colleges and Experiment Stations in the United States." They differ from the latter in that they include only names of persons directly engaged in teaching, investigation, or demonstration in agriculture and home economics.

The names are arranged alphabetically for each institution. This arrangement, with the name index at the end of the lists, it is thought, will facilitate the finding of names, especially in the longer lists. An asterisk (\*) indicates a college officer, a dagger (†) a station officer, and a double dagger (‡) an extension worker. When the title of the position in the station differs from that in the college the latter is given first, except in the case of the director of the station. A key to the abbreviations used is given on page 4.

- \*B. B. Ross, M. S., *Dean Agr. Sci., Chem.* (*State Chem.*).  
 \*J. R. Rutland, A. B., *Libr.*  
 \*J. C. Schoenlaub, D. V. M., *Supervisor of Serum Lab.*  
 †‡O. H. Sellers, B. S., *Asst. Agron. Sec. to Dir.*  
 \*†G. C. Starcher, B. Agr., *Hort.* (*State Hort.*)  
 \*R. S. Sugg, B. S., D. V. M., *Instr. Histol.*  
 \*†‡G. S. Templeton, B. S., *An. Husb.*  
 \*†F. L. Thomas, Ph. D., (*Asst.*) *Ent.*; *Asst. Ent.*  
 †‡E. A. Vaughan, M. S., *Ent. Field Agt.*  
 \*W. W. Webb, D. V. M., *Instr. Physiol., Therapeutics.*  
 \*L. T. Wells, B. S., *Instr. An. Husb.*  
 \*G. R. White, M. D., D. V. S., *Lect. on An. Restraint and Surg.*  
 †J. T. Williamson, B. S., *Field Agt. in Agron.*  
 †H. C. Wilson, D. V. M., *Hog Cholera Expert (Coop. U. S. D. A.)*.  
 \*†S. A. Wingard, B. S., *Instr. Agron.*; *Asst. Agron.*

**Canebrake Agricultural Experiment Station, Uniontown.**

†L. H. Moore, *Director in Charge.*

**Agricultural and Mechanical College for Negroes, Normal.**

\*College faculty. ‡Extension staff.

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- †Mrs. Lottie R. Beadle, *Home Makers' Clubs.*  
 \*Birdie O. Bird, *Home Decoration.*  
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 \*D. V. Darden, M. D., *Sanitary Sci., Nursing.*  
 \*Mrs. Ellen M. Darnell, *Millinery, Fancy Sewing.*  
 \*W. T. Gravitt, *Farm Mgr., Field Crops.*  
 \*Mrs. Mollye A. Grice, *Libr.*  
 \*Ella L. Hawkins, *Plain Sewing.*  
 \*H. C. Hopkins, M. S., *Ele. Agr.*  
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 \*Mrs. Odessa M. Parker, *Dom. Sci.*  
 \*†P. C. Parks, B. S., *Dir. of Agr. Boy's Club Agt.*  
 †G. W. Patterson, *Farm Dem.*  
 \*Mrs. Cornelia J. Pickett, *Laundry.*  
 †Susan T. Whitfield, *Home Econ. Ext.*

**Agricultural School and Agricultural Experiment Station of the Tuskegee Normal and Industrial Institute, Tuskegee Institute.**

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\*†G. R. Bridgeforth, B. S., *Dir. of Agr. Dept. Dir. Agr. Ext.*

†G. W. Carver, M. S., *Dir. of Sta. Dept. of Research. Consult. Chem.*

- \*†Cleveland Abbott, *Asst. in Agr. Instr.*  
 \*†R. C. Atkins, *Dairy Husb.*  
 \*H. B. Benson, *Canning, Swine Raising.*  
 \*†J. H. Blas, D. V. M., *Vet.*  
 \*H. H. Boger, *Head Div. of Agr. Instr.*  
 \*St. Elmo Brady, Ph. D., *Chem.*  
 \*Mary E. Brown, *Sewing and Cooking.*  
 \*C. J. Calloway, *Dir. of School Ext.*  
 †T. M. Campbell, *Agr. Ext. Dem. Agt.*  
 †N. Juanita Coleman, *Home Econ. Ext.*  
 \*Juanita Conyers, *Asst. in Agr. Instr.*  
 \*†T. N. Cowen, *Farm Supt.*  
 \*Mary E. Davis, *Housekeeping.*  
 \*Minnie E. Davis, *Housekeeping.*  
 \*†E. C. Dobbs, *Asst. to Farm. Supt.*  
 \*Ophelia M. Donaldson, *Laundering.*  
 †C. W. Greene, *Agr. Ext. Dem. Agt.*  
 \*Della D. Harris, *Ladies' Tailoring.*  
 \*†H. H. Harris, *Dairying.*  
 \*†W. W. Hayes, *Truck Gardening.*  
 \*Henry Howard, *Gardening.*  
 \*J. J. Jones, *Agr. Bookkeeper.*  
 \*Hattie E. King, *Plain Sewing, Dress-making.*  
 \*Caroline S. Owen, *Basketry, Mattress Making, Upholstering.*  
 \*†N. D. Ricks, *Fruit Growing.*  
 \*Mary B. Scott, *Housekeeping.*  
 \*H. W. Seals, *Milling.*  
 \*Ernestine Suarez, *Libr.*  
 \*Lorena C. Taylor, *Dom. Sci.*  
 \*Cornelia A. Vivian, *Millinery.*  
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 \*B. T. Washington, jr., *Asst. to Dir. School Ext.*  
 \*†L. J. Watkins, *Road Bldg., Survey.*  
 \*†G. D. White, *Poultry Husb.*  
 \*†J. E. Whitfield, *Swine Husb.*  
 \*Luvenia Williams, *Housekeeping.*  
 \*J. T. Williamson, A. B., *Chem.*  
 \*D. A. Williston, B. S., *Bot.*  
 \*†Matthew Woods, *Horse Husb.*

## ALASKA.

**Agricultural Experiment Stations, Sitka, Kodiak, Rampart, and Fairbanks.**

Under the supervision of the Office of Experiment Stations, States Relations Service,  
United States Department of Agriculture.

†Station staff.

†C. C. Georgeson, Sc. D., *Agronomist in charge, Sitka.*

†T. D. Crippen, B. S., *Asst., Fairbanks.*

†G. W. Gasser, B. S., *Asst. in charge, Rampart.*

†J. C. Laney, B. S., *Asst. Dairyman, Kodiak.*

†J. W. Neal, *Asst. in charge, Fairbanks.*

†H. E. Pratt, B. S., *An. Husb., Kodiak.*

†M. D. Snodgrass, B. S., *Asst. in charge, Kodiak.*

## ARIZONA.

**College of Agriculture and the Agricultural Experiment Station of the  
University of Arizona, Tucson.**

\*College faculty. †Station staff. ‡Extension staff.

\*R. B. von Klein Smid, A. M., D. Sc., *President of University*

\*†R. H. Forbes, Ph. D., *Dean Coll. of Agr. Dir. of Sta.*

‡E. P. Taylor, M. S., *Supt. of Agr. Ext. Service. State Leader.*

†G. W. Barnes, B. S., *Live Stock Specialist.*

\*Anna Bishop, *Instr. Home Econ.*

\*P. H. M. Brinton, Ph. D., *Anal. Chem.*

\*J. G. Brown, M. S., *Instr. Bot., Zool.*

\*†W. E. Bryan, M. S., *Asst. Plant Breeder.*

\*†C. N. Catlin, A. M., (Asst.) *Chem.; Asst. Chem.*

\*†W. S. Cunningham, B. S., (Asst.) *An. Husb.; Asst. An. Husb.*

\*A. E. Douglass, Sc. D., *Phys.*

†A. L. Enger, B. S., *Asst. Irrig. Engin.*

\*H. W. Estil, M. S., *Instr. Chem.*

\*†G. F. Freeman,<sup>1</sup> B. S., *Plant Brdg.*

\*F. N. Guild,<sup>1</sup> M. S., *Chem.*

†H. C. Heard, B. S., *Asst. Agron.*

\*†S. B. Johnson, B. S., (Asst.) *Hort.; Asst. Hort.*

\*Estelle Luttrell, A. B., *Libr.*

\*C. A. Meserve, Ph. D., *Bact. and Food Chem. (State Chem.).*

†P. W. Moore, M. S., *Asst. in Plant Brdg.*

†A. W. Morrill, Ph. D., *Consult. Ent. (State Ent., Phoenix.)*

\*†J. F. Nicholson, M. S., *Agron.*

‡L. S. Parke, *State Club. Agt.*

‡Edith G. Salisbury, *Ext. Instr. Home Econ. (Phoenix.)*

†T. E. Schreiner, *Asst. in Poultry Husb.*

†G. E. P. Smith, C. E., *Irrig. Engin.*

\*DeRossette Thomas, B. S., (Asst.) *Home Econ.*

\*†J. J. Thornber, M. A., *Bot.*

\*†A. E. Vinson, Ph. D., *Agr. Chem.; Biochem.*

\*C. T. Vorhies, Ph. D., (Asst.) *Biol.*

\*Jessamine C. Williams, B. S., (Asst.) *Home Econ.*

\*†R. H. Williams, Ph. D., *An. Husb.*

## ARKANSAS.

**College of Agriculture and the Agricultural Experiment Station of the  
University of Arkansas, Fayetteville.**

\*College faculty. †Station staff. ‡Extension staff.

\*J. C. Futrall, A. M., *President of University.*

\*†Martin Nelson, M. S., *Dean Coll. of Agr. Dir. of Sta.*

‡W. C. Lassetter, B. S., *Acting Dir. Ext. Work (Little Rock).*

†Emma Archer, *State Home Dem. Agt. (Little Rock).*

†Marcella Arthur, B. S., *Specialist in Home Econ.*

\*†W. E. Ayres, M. S., *Instr. Agron.; Asst. Agron.*

\*†P. B. Barker, A. M., *Agron. Head Agron. Dept.*

<sup>1</sup> On leave.

- \*†G. G. Becker, B. S., *Ent. Actg. Head of Dept.*  
 \*†G. L. Caldwell, D. V. M., *Instr. Vet. Sci.; Asst. in Vet. Sci., Bact.*  
 ‡W. A. Denman, *Specialist in Vat Construction.*  
 \*†H. E. Dvorachek, B. S., *An. Husb. Head An. Husb. Dept.*  
 \*†W. S. Fields, B. S. A., *Instr. Plant Path.; Asst. Plant Path.*  
 ‡Lawrence Foot, *Specialist in Meat Curing (Little Rock).*  
 ‡D. R. Forrester, B. S., *Specialist in An. Husb.*  
 \*†R. M. Gow, D. V. M., *Head Dept. Vet. Sci.; Vet. (State Vet., Little Rock).*  
 \*J. S. Guy, Ph. D., *Chem.*  
 \*†C. H. Heard, M. S., *Asst. Hort.*  
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| *G. A. Harter, Ph. D., <i>Phys.</i>                                       | *†Firman Thompson, B. S., <i>Agr. Chem.</i>                               |
| *C. O. Houghton, B. A., <i>Zool., Bot.</i>                                | *H. E. Tiffany, M. S., ( <i>Asst.</i> ) <i>Chem.</i>                      |
| †Elizabeth Jefferson, B. S., <i>Home Econ. Ext.</i>                       | *†A. C. Whittier, B. S., ( <i>Asst.</i> ) <i>Agr. Chem.; Assoc. Chem.</i> |
| *†C. A. McCue, B. S., <i>Hort.</i>  |   |

**State College for Colored Students, Dover.**

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| *W. L. Floyd, M. S., <i>Bot., Hort. Asst. Dean Coll. of Agr.</i> | †Julius Matz, B. S., <i>Asst. in Plant Path.</i>                                |



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 \*Leola Hudson, A. B., *Cooking.*

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 †Lois P. Dowdle, *Asst. State Supervisor Home Econ.*  
 †J. E. Downing, *Asst. State Supervisor Pig Clubs (Coop. U. S. D. A.)*.  
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 †J. W. Firor, B. S., (*Junior*) *Hort.*  
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 \*L. C. Hart, E. E., *Agr. Engin.*  
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 †D. D. Long, B. S., *Soil Expert in State Survey.*  
 †M. W. Lowry, M. A., (*Adjunct*) *Soil Chem.*  
 \*T. H. McHatton, D. Sc., *Hort.*  
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 †Elmo Ragsdale, B. S. A., *Field Agt. in Hort.*  
 \*L. E. Rast, B. S. A., (*Junior*) *Agron. in charge Cotton Indus.*  
 \*J. M. Reade, Ph. D., *Bot.*

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| *†S. H. Starr, B. S. A., ( <i>Adjunct</i> ) <i>Farm Mgt.</i>          | *H. C. White, Ph. D., Sc. D., <i>Chem.</i>                      |
| ‡Paul Tabor, M. S., <i>Field Agt. in Agron.</i>                       | *C. A. Whittle, A. B., <i>Editor, Libr.</i>                     |
| †D. J. Taylor, B. S. A., <i>Asst. State Supervisor Poultry Clubs.</i> | *C. N. Wilder, B. S., <i>Tutor in Agr. Chem.</i>                |
| †P. O. Vanatter, <i>Supt. Field Expts.</i>                            | ‡Mrs. Bessie S. Woods, <i>Asst. State Supervisor Home Econ.</i> |
|   | *W. A. Worsham, jr., A. M., <i>Agr. Chem.</i>                   |

### Georgia Experiment Station, *Experiment.*<sup>1</sup>

Department of Georgia State College of Agriculture at Athens.

†Station staff.

†H. P. Stuckey, B. S., *Acting Director. Hort.*

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| †B. B. Higgins, Ph. D., <i>Bot., Plant Path.</i> | †J. C. Temple, M. S., <i>Bact.</i> |
| †C. K. McClelland, M. S. A., <i>Agron.</i>       |                                    |

### Georgia State Industrial College for Colored Youths, University of Georgia, Savannah.

\*College faculty. ‡Extension staff.

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| *Mrs. W. G. Hill, <i>Instr. Dom. Sci.</i>      | *Mrs. W. P. White, <i>Instr. Sewing, Dress-making.</i> |
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| *M. J. Smitherman, <i>Instr. Poultry Husb.</i> |  |
| *R. H. Thomas, <i>Farm Supt.</i>               |  |

### GUAM.

#### Agricultural Experiment Station, Guam, Island of Guam.

Under the supervision of the Office of Experiment Stations, States Relations Service, United States Department of Agriculture.

†Station staff.

†A. C. Hartenbower, B. S., *Agronomist in charge.*

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| †C. W. Edwards, B. S., <i>An. Husb.</i> | †Peter Nelson, <i>Asst.</i> |
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### HAWAII.

#### College of Hawaii, Honolulu.

\*College faculty.

\*A. L. Dean, Ph. D., *President. Chemistry.*

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| *Elizabeth L. Bryan, Sc. D., <i>Libr.</i>                    | *J. M. Kuhns, M. D., <i>Instr. Bact.</i>                   |
| *W. A. Bryan, B. S., <i>Zool.</i>                            | *Florence M. Lee, B. S., ( <i>Asst.</i> ) <i>Dom. Sci.</i> |
| *Minnie E. Chipman, <i>Ceramics and Design. (Dom. Arts).</i> | *Vaughan MacCaughey, B. S. A., <i>Bot.</i>                 |
| *L. C. Clark, B. S., ( <i>Asst.</i> ) <i>An. Husb.</i>       | *J. F. C. Rock, <i>Bot.</i>                                |
| *F. T. Dillingham, M. A., <i>Chem.</i>                       | *Arnold Romberg, Ph. D., <i>Phys.</i>                      |
| *L. A. Henke, B. S., <i>Agr.</i>                             | *H. S. Walker, A. B., <i>Sugar Tech.</i>                   |

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**Agricultural Experiment Station, Honolulu.**

Under the supervision of the Office of Experiment Stations, States Relations Service,  
United States Department of Agriculture.

†Station staff. ‡Extension staff.

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‡F. G. Krauss, *Supt. Ext. Work (Haiku).*

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†J. E. Higgins, M. S. A., *Hort.*

†M. O. Johnson, M. S., *Chem.*

†A. T. Longley, *in charge Coop. Marketing Invest.*

†C. A. Sahr, *Asst. Agron.*

†Alice R. Thompson, M. A., *Asst. Chem.*

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**Hawaiian Sugar Planters' Experiment Station, Honolulu.**

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†W. P. Alexander, Ph. B., *Asst. Agr.*

†R. M. Allen, B. S., *Asst. Agr.*

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†E. L. Caum, B. A., *Asst. Path.*

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†George Hutchinson, B. S., *Asst. Chem.*

†A. Koebele<sup>1</sup>, *Consult. Ent.*

†Y. Kutsunai, B. S., *Asst. Agr.*

†L. D. Larsen, B. S., *Agr.*

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†R. C. L. Perkins<sup>1</sup>, Sc. D., *Consult. Ent.*

†W. R. R. Potter, P. E., *Illustrator.*

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†O. H. Swezey, M. S., *Ent.*

†R. S. Thurston, B. S., *First Asst. Agr.*

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†F. R. Werthmueller, B. S., *Asst. Chem.*

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**IDAHO.****College of Agriculture and the Agricultural Experiment Station of the University of Idaho, Moscow.**

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\*†W. A. Gardner, Ph. D., *(Assoc.) Bot.; Plant Physiol.*

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\*A. R. Hahner, D. V. S., *(Asst.) Vet. Sci.*

\*E. W. Hamilton, B. S., B. M. E., *(Assoc.) Agr. Engin.*

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†Elizabeth Hays, B. S., *Asst. in Home Econ. (Boise).*

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\*†E. B. Hitchcock, M. S., *Instr. Soils; Asst. Soil Tech.*

‡H. W. Hochbaum, B. S. A., *State Leader of County Agts. (Boise).*

\*H. A. Holaday, B. A., *Asst. Chem.*

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 ‡Amy Kelly, B. S., *Lect. in Home Econ. (Boise).*  
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## ILLINOIS.

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 \*†E. W. Bailey, M. S., (*Asst.*) *Pomol.; Asst. Chief Plant Brdg.*  
 \*‡D. O. Barto, B. S., *Assoc. An. Husb.*  
 \*‡‡F. C. Bauer, B. S., *Assoc. Soil Fert.*  
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 \*†H. C. Eckstein, A. B., *Asst. in An. Nutr.*



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\*†D. T. Englis, Ph. D., *Instr. Flor. Chem.*; *First Asst. Flor. Chem.*  
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\*†F. A. Fisher, B. S., *Instr. Soil Phys.*; *First Asst. in Soil Phys.*  
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\*W. J. Fraser, M. S., *Dairy Farming.*  
\*Marie Freeman, A. B., *Asst. in Lunch Room Mgt.*  
†F. W. Garrett, B. S., *First Asst. in Soil Fert.*  
†G. E. Gentle, B. S., *First Asst. in Soil Phys.*  
\*†W. B. Gernert, Ph. D., *Assoc. Plant Brdg.*  
\*†H. C. Gilkerson, B. S., *Instr. Soil Fert.*; *First Asst. in Soil Fert.*  
†E. E. Glick, B. S., *Asst. in Soil Fert.*  
\*Corra E. Gray, M. S., *Assoc. Household Sci.*  
\*†Anne I. Green, B. S., *Asst. in Home Econ. Ext.*  
†J. H. Greene, M. S., *State Leader Junior Ext.*  
\*†H. S. Grindley, Sc. D., *An. Nutr.*; *Chief An. Nutr.*  
\*†A. J. Gunderson, B. S., *Instr. Pomol.*; *First Asst. Pomol.*  
\*Gilbert Gusler, B. S., *Assoc. An. Husb.*  
\*†A. F. Gustafson, M. S. (*Asst.*) *Soil Phys.*; *Asst. Chief in Soil Phys.*  
\*†H. A. Harding, Ph. D., *Dairy Bact.*; *Chief Dairy Bact.*  
\*†Claude Harper, B. S., *Asst. An. Husb.*  
\*Florence Harrison, B. S., *Assoc. Household Sci.*  
\*†A. G. Hecht, B. S., *Asst. Flor.*  
\*†N. W. Hepburn, M. S., (*Asst.*) *Dairy Mfrs.*; *Asst. Chief Dairy Mfrs.*  
\*R. E. Hieronymus, LL. D., *Community Advisor.*  
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- †O. S. Crisler, D. V. M., *Ext. Vet.*
- †H. E. Curtis, M. S., *Head Fert. Dept.*
- †R. C. Dabney, B. S., *Insp. Bakery Sanitation.*
- \*L. C. Daniels, Ph. D., (*Asst.*) *Chem.*
- †Mary LeG. Didlake, M. S., *Asst. Ent., Bot.*
- †N. R. Elliott, B. S., *Asst. in Hort.*
- †A. E. Ewan, B. S., *Supt. Expt. Fields, Greenville.*
- \*J. A. Farra, B. S., (*Asst.*) *Agr. Engin.*
- \*†Harrison Garman, D. Sc., *Ent., Zool.; Head Ent. and Bot. Dept.*
- \*A. H. Gilbert, M. S., (*Assoc.*) *Bot.*
- \*†E. S. Good, M. S., *An. Husb.; Head An. Husb. Dept. (Beef Cattle, Sheep, Swine).*
- \*†A. K. Gordon, B. S., *Instr. Farm Crops; Asst. Agron.*
- †E. J. Gott, B. S., *Asst. in Hog Cholera Serum Prod.*
- \*†Robert Graham, D. V. M., B. S., *Vet. Sci.; Head Dept. Diseases of Live Stock.*
- \*†D. J. Healy, M. D., *Bact.; Bact. Research.*
- \*†J. J. Hooper, M. S. A., *An. Husb.; Head An. Husb. Dept. (Dairy Cattle, Horses, Poultry).*
- †Ed Huston, *Asst. in Dairying.*
- †Elmer Ingram, *Chief Insp. Dept. Coml. Feed Stuffs.*
- †H. H. Jewett, M. A., *Asst. Ent., Bot. (Research).*
- †R. W. Jones, *Insp. Feeds and Fert.*
- \*†P. E. Karraker, M. A., (*Asst.*) *Soil Phys.; Asst. Agron.*
- †Otis Kercher, B. S., *in charge Pig Club Work (Detailed U. S. D. A.).*
- \*†E. J. Kinney, B. S., (*Assoc.*) *Agron.; Asst. Agron.*
- †J. O. La Bach, M. S., *Actg. Head and Chief Chem. (Food and Drug Dept.).*
- †O. S. Lee, B. S., *Asst. Chem. (Fert.).*
- \*F. T. McFarland, B. S., (*Asst.*) *Bot.*
- †J. W. McFarlin, B. S., *Chief Insp. Foods (Franklin).*
- †J. S. McHargue, M. S., *Asst. Chem.*
- \*†C. W. Mathews, B. S., *Hort.; Head Hort. Dept.*
- \*R. N. Maxson, Ph. D., *Inorg. Chem.*
- \*A. McQ. Miller, A. M., *Geol.*
- \*J. R. Mitchell, A. B., *Instr. Chem.*
- \*†W. D. Nicholls, M. S., (*Assoc.*) *Dairy Husb.*
- †H. R. Niswonger, M. A., *Asst. Nursery Insp. (Ent., Bot.).*
- †J. W. Nutter, *Supt. Dairy Farm.*

<sup>1</sup> On leave.

- †A. J. Olney, B. S., *Asst. in Hort.*  
 †Cornelia C. Page, *Libr.*  
 \*M. L. Pence, M. S., *Phys.*  
 \*†W. R. Pinnell, M. D., (*Assoc.*) *Bact.; Bact. (Food and Drugs).*  
 †R. L. Pontius, V. S., *Asst. in Hog Cholera Serum Prod.*  
 †C. S. Porter, A. B., Ph. G., *Insp. Drugs.*  
 \*Ellen A. Reynolds, M. S., (*Asst.*) *Nutr. and Sanitation.*  
 †G. M. Roach, *Insp. Food and Drug Dept.*  
 †Wm. Rodes, M. S., *Asst. Chem. (Fert.).*  
 †C. E. Rodgers, A. B., *Asst. Chem.*  
 †O. M. Shedd, M. S., *Chem. (Research).*  
 †W. H. Simmons, V. S., *Dairy Insp. (Food and Drug Dept.).*  
 †D. D. Slade, *Poultry Work.*  
 †H. D. Spears, M. S., *Chem. (Coml. Feed Stuff Dept.).*  
 \*W. H. Staebner, A. B., *Instr. Chem.*
- \*C. F. Stiles, B. S., *Asst. in Ent., Zool.*  
 \*Mary E. Sweeney, M. S., *Dean Coll. of Home Econ.*  
 †R. B. Taylor, B. S., *Asst. Chem. (Fert.).*  
 \*D. V. Terrell, C. E., (*Actg.*) *Rural and Highway Engin.*  
 \*R. C. Terrell,<sup>1</sup> C. E., *Rural and Highway Engin.*  
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 †J. D. Turner, LL. B., *Head Coml. Feed Stuff Dept.*  
 \*F. E. Tuttle, Ph. D., *Chem.*  
 \*G. H. Vansell, (*Asst.*) *Ent., Zool.*  
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 \*†J. W. Wesson, B. A., *Asst. in Agr. Econ.*  
 \*Clara W. White, *Instr. Home Econ.*  
 \*†R. H. Wilkins, M. S., *Research Asst. in Poultry.*

**The Kentucky Normal and Industrial Institute for Colored Persons,**  
*Frankfort.*

\*College faculty.

\*G. P. Russell, A. B., LL. B., *President.*

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 \*J. S. Estill, A. M., *Dean.*  
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 \*D. L. Lawson, A. M., *Nat. Sci.*
- \*Mrs. Anna T. O'Neal, *Instr. Dom. Art.*  
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**LOUISIANA.**

**The Louisiana State University and Agricultural and Mechanical College and the State Experiment Station, Baton Rouge; the Sugar Station, Audubon Park, New Orleans; the North Louisiana Station, Calhoun; and the Rice Station, Crowley.**

\*College faculty. †Station staff. ‡Extension staff.

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 \*††W. R. Dodson, B. S., *Dean Coll. of Agr. Dir. of Stations. Dir. Agr. Ext. Dept. Agr. (\*)*
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 †W. H. Balis, B. S., *Asst. Supt. Dept. Junior Ext., in charge Boys' Pig Clubs.*  
 †C. J. Barrilleaux, *Farm Mgr., Sugar Sta.*  
 \*Annie M. Beale, *Libr.*  
 \*A. T. Bell, A. M., *Bot., Bact.*  
 †S. Byall, B. S., *Asst. Chem.*  
 \*J. M. Cadwallader, B. S., (*Asst.*) *An. Indus.*  
 †G. D. Cain, B. S., *Chem. in charge of Fert. and Feed Stuff Lab.*  
 †R. C. Calloway, B. S., *in charge Dairy.*  
 \*C. E. Coates, Ph. D., *Chem.*  
 \*†W. H. Dalrymple, M. R. C. V. S., *Vet. Sci.; Vet. Vice Dir. of Stas.*
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 †C. W. Edgerton, Ph. D., *Plant Path.*  
 †E. O. Edson, B. S., *Asst. in charge Poultry Clubs.*  
 \*†F. V. Emerson, Ph. D., *Geol.; in charge Soil Survey Work.*  
 \*Nellie Fitzgerald, B. S., *Dir. of Home Econ.*  
 †J. B. Garrett, B. S., *Ent.*  
 \*W. H. Gates, B. A., *Zool., Ent.*  
 †P. L. Guilbeau, B. S., *State Supervisor Agr. Schools.*  
 \*D. V. Guthrie, Ph. D., *Phys.*

<sup>1</sup> On leave.

†W. M. Hall, B. S., *Asst. Chem.*  
 †C. E. Hester, B. S., *Asst. Dir. N. La. Sta.*  
 ‡Alice Hickman, *Asst. in Home Dem. Work.*  
 †J. L. Hiers, M. S., *Asst. in charge Boys' Corn Clubs.*  
 †J. M. Jennings, M. S., *Asst. Chem.*  
 †T. H. Jones, B. S., *Asst. Ent. (Detailed U. S. D. A.)*  
 \*E. L. Jordan, B. S., *An. Indus.*  
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 †‡A. P. Kerr, M. S., *Asst. Dir. State Sta. Asst. Dir. Agr. Ext. Dept.*  
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 \*E. M. Lanier, B. S., *Instr. Agron.*  
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 †J. K. McHugh, *Sec., Sugar Sta.*  
 \*R. L. Menville, M. S., (*Asst.*) *Chem.*  
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 \*C. F. Moreland, B. S., *Instr. Bot.*  
 †Harry Morris, D. V. M., *Bact., Asst. Vet.*  
 †G. E. Nesom, M. S., *Supt. Live Stock Ext. Dept.*  
 †M. G. Osborn, B. A., *Editor Weekly Press Bul. Sec. Agr. Ext.*

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 †F. C. Quereau, M. S., *Asst. Dir. Rice Sta. (Coop. U. S. D. A.)*  
 †J. A. Redhead, *Asst. State Agt. Farmers' Coop. Dem. Work.*  
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 †M. A. Schneller, Ph. D., *Chem., Sugar Sta.*  
 †I. Selecter, B. S., *Soil Chem.*  
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 †Mason Snowden, B. S., *State Agt. Farm Dem. Work.*  
 †C. H. Staples, B. S., *Dairying, Live Stock Ext. Dept.*  
 †Mrs. E. L. Strong, *Sec.*  
 †A. D. Summers, *Farm Mgr.*  
 \*†R. P. Swire, B. A., *Treas.*  
 †W. G. Taggart, B. S., *Asst. Dir. Sugar Sta.*  
 †‡G. L. Tiebout, B. S., *Hort. Packing and Shipping Dem.*  
 †J. W. Wilkinson, *Supt. Farm Study Clubs.*  
 †Turner Wright, B. S., *Field Asst. in Market Invest. (Detailed U. S. D. A.)*

**Southern University and Agricultural and Mechanical College of the State of Louisiana, Scotland Heights, Baton Rouge.**

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 \*Mrs. E. N. Maberry, *Instr. Dom. Sci.*

\*Annie M. Mollison, *Instr. Sewing.*  
 \*C. S. Woodard, B. S., *Instr. Agr.*

**MAINE.**

**College of Agriculture and the Agricultural Experiment Station of the University of Maine, Orono.**

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 †C. D. Woods, Sc. D., *Dir. of Sta.*

†H. C. Alexander, *Lab. Asst. Chem.*  
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 \*Alice M. Boring, Ph. D., (*Assoc.*) *Zool.*  
 \*J. M. Briscoe, M. F., *For.*  
 \*B. S. Brown, M. S., *Hort.*  
 \*L. M. Burghart, M. A. (*Asst.*) *Chem.*  
 \*M. A. Chrysler, Ph. D., *Biol.*  
 \*H. N. Conser, M. S., (*Asst.*) *Bot.*  
 \*L. S. Corbett, M. S., *An. Indus.*  
 †Maynle R. Curtis, Ph. D., *Asst. Biol.*

†W. E. Curtis, *Sci. Aid (Monmouth).*  
 \*C. W. Easley, Ph. D., (*Assoc.*) *Chem.*  
 \*C. W. Eaton, M. F., (*Assoc.*) *For.*  
 \*Frances R. Freeman, M. S., *Home Econ.*  
 \*N. A. French, B. S., *Instr. Phys.*  
 †Kathryn T. Gordon, B. S., *Ext. Instr. Home Econ.*  
 †H. G. Gulliver, A. B., *Sci. Aid (Monmouth).*  
 †R. L. Hammond, *Seed Analyst, Photog.*  
 †H. H. Hanson, M. S., *Assoc. Chem.*

- †Mary I. Haskell, B. S., *in charge Girls' Agr. Clubs.*  
 \*R. M. Holmes, M. A., (Asst.) *Phys.*  
 \*L. V. Jones, LL.B., *Lect. on For. Law.*  
 \*R. K. Jones, B. S., *Libr.*  
 \*Helen A. Knight, Ph. B., *Instr. Home Econ.*  
 \*Esther McGinnis, B. S., *Instr. Home Econ.*  
 \*L. H. Merrill, Sc. D., *Biol., Agr. Chem.*  
 †J. R. Miner, A. B., *Computer.*  
 †R. P. Mitchell, *in charge Boys' Agr. Clubs.*  
 †W. C. Monahan, B. S., *Ext. Instr. in Poultry.*  
 †P. W. Monohon, B. S., *Asst. County Agt. Leader.*  
 †W. J. Morse, Ph. D., *Plant Path.*  
 \*R. T. Muller, B. S., *Instr. Hort.*  
 \*H. S. Osler, B. S., (Asst.) *Agron.*  
 †Edith M. Patch, Ph. D., *Ent.*  
 \*S. W. Patterson, B. S., *Instr. Biol. and Agr. Chem.*  
 †Raymond Pearl, Ph. D., *Biol.*  
 †J. A. Perry, B. S., *Asst. Chem.*  
 †Catherine Platts, B. S., *Ext. Instr. Home Econ.*  
 †G. B. Ramsey, A. M., *Asst. Plant Path. (Coop. U. S. D. A.).*
- \*A. W. Richardson, B. S., *Instr. Poultry Indus.*  
 \*F. L. Russell, B. S., V. S., *Bact., Vet. Sci.*  
 †Michael Shapovalov, M. S., *Asst. Plant Path. (Coop. U. S. D. A.).*  
 †N. C. Sherwood, M. S., *Ext. Instr. in Dairying.*  
 \*G. E. Simmons, M. S., *Agron.*  
 †Wellington Sinclair, *Supt. Highmoor Farm, Monmouth.*  
 \*S. B. Sink, B. S., *Instr. Soils.*  
 \*H. W. Smith, B. S., (Asst.) *Bact.*  
 †W. J. Spruce, *Lab. Asst. in Plant Path.*  
 \*J. S. Stevens, M. S., LL. D., *Phys.*  
 \*J. N. Stevenson, M. S., (Asst.) *Chem.*  
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 †F. M. Surface, Ph. D., *Biol.*  
 \*H. P. Sweetser, B. S., (Asst.) *Hort.*  
 \*J. F. Thomas, B. S., *Instr. An. Indus.*  
 †E. R. Tobey, B. S., *Asst. Chem.*  
 \*Frances Whitcomb, B. S., (Asst.) *Home Econ.*  
 †C. H. White, *Sci. Aid.*  
 \*O. M. Wilbur, B. S., *Instr. An. Indus.*  
 \*L. E. Woodman, Ph. D., (Assoc.) *Phys.*  
 †Jacob Zinn, D. Agr., *Asst. Biol.*

## MARYLAND.

## Maryland State College of Agriculture and the Agricultural Experiment Station, College Park.

\*College faculty. †Station staff. ‡Extension staff.

\*H. J. Patterson, D. Sc., *President of College. Dir. of Sta.*  
 †T. B. Symons, M. S., *Dir. of Ext. (State Hort. Work).*

- †G. H. Alford, B. S., *State Agent.*  
 †R. S. Allen, *Asst. Swine Husb.*  
 \*B. W. Anspen, B. S., *Landsc. Gard., Flor. (State Work).*  
 †C. O. Appleman, Ph. D., *Plant Physiol.*  
 †W. R. Ballard, B. S., *Pomol., Small Fruits.*  
 \*Herman Beckenstrater, M. S., *Pomol.*  
 \*F. W. Besley, M. F., D. Sc., *Lect. on For.*  
 \*F. B. Bomberger, A. M., *Dean Rural Econ. and Sociol.*  
 †Reuben Brigham, B. S., *Boys' Club Work.*  
 †E. H. Brinkley, *Farm Supt.*  
 \*L. B. Broughton, M. S., *Anal. Chem.*  
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 †S. S. Buckley, M. S., D. V. S., *Vet. Sci.*  
 †K. C. Cole, *Asst. Agron.*  
 \*Miss L. E. Conner, *Assoc. Libr.*  
 \*E. N. Cory, M. S., *Zool.; Ent.*  
 \*Myron Creese, E. E., *Phys.*  
 \*S. C. Dennis, M. S., *Instr. Bact.*  
 †Philip Garman, Ph. D., *Asst. Ent.*  
 †R. L. Hill, Ph. D., *Biochem.*  
 †W. M. Hillegeist, *Sec. Corresp. Study Dept.*
- †F. S. Holmes, M. S., *Nut and Stone Fruits.*  
 \*T. D. Jarrell, B. S., *First Asst. Chem. (State Work).*  
 †W. B. Kemp, B. S., *Agron.*  
 †A. G. McCall, Ph. D., *in charge Soil Invest.*  
 \*H. B. McDonnell, M. S., M. D., *Chem. (State Chem.).*  
 \*J. E. Metzger, B. S., *Agr. Ed.*  
 †J. B. S. Norton, M. S., *Veg. Path., Bot.*  
 †C. L. Opperman, *Supt. Ridgely Substa.*  
 †S. W. Phillips, M. S., *Asst. in Soil Invest.*  
 \*C. J. Pierson, M. S., *Asst. Ent., Zool.*  
 †Katharine A. Pritchett, B. S., *State Agent in Home Dem. Work.*  
 †C. G. Rensburg, M. S., *Asst. Chem. (State Work).*  
 †P. E. Richards, M. S., *Asst. in Soil Invest.*  
 \*R. H. Ruffner, B. S., *An. Husb.*  
 †Nickolas Schmitz, M. S., *Agron.*  
 †S. B. Shaw, M. S., *Ext. Pomol. (State Pomol.).*  
 †C. P. Smith, A. M., *Seed Insp.*  
 \*T. H. Spence, A. M., *Vice Pres.*



- \*A. C. Stanton, A. M., *Instr. Dairy Husb.*  
 \*E. F. Stoddard, B. S., *Veg. Culture.*  
 \*W. T. L. Taliaferro, A. B., *Farm Mgt.*  
*Actg. Dean of Agr.*  
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 †R. H. Waite, B. S., *Poultryman.*

- \*J. B. Wentz, M. S., (*Assoc.*) *Crops.*  
 \*H. J. White, B. S., *Instr. Chem. (State*  
*Work).*  
 †T. H. White, M. S., *Veg., Flor.*  
 †G. E. Wolcott, M. S., *Dairy Work*  
*(Coop. U. S. D. A.).*  
 \*P. W. Zimmerman, M. S., *Assoc. Bot.*

**Princess Anne Academy for Colored Persons, Princess Anne.**

\*College faculty.

- \*J. O. Spencer, Ph. D., *President (Baltimore).*  
 \*T. H. Kiah, A. M., *Principal. Agr.*

- \*Lida L. Brown, A. B., *Dom. Sci.*  
 \*S. H. Dix, A. B., *Bot., Zool.*  
 \*H. J. Hitch, *Market Gard.*

- \*J. E. Smith, *Phys. Sci., Agr., Dairying.*  
 \*Sara F. Tyler, *Dom. Sci. and Art.*

**MASSACHUSETTS.**

**Massachusetts Agricultural College and the Agricultural Experiment Station, Amherst.**

\*College faculty. †Station staff. ‡Extension staff.

- \*K. L. Butterfield, A. M., LL. D., *President. Head Div. Rural Social Sci. (\*)*  
 \*†W. P. Brooks, Ph. D., *Dir. of Sta. Lect. on Soil Fert. (\*) Agr. (†)*  
 †W. D. Hurd, M. Agr., *Dir. Ext. Service. Supervisor Short Courses. State Leader of*  
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- †J. R. Alcock, *Asst. An. Nutr.*  
 †H. L. Allen, *Asst. Lab. Chem.*  
 †W. A. Allen, B. S., *Asst. Chem.*  
 \*Ernest Anderson, Ph. D., *Gen. and Phys.*  
*Chem.*

- \*†P. J. Anderson, Ph. D., (*Assoc.*) *Bot.;*  
*Assoc. Plant Path.*

- \*S. C. Ball, Ph. D., *Instr. Zool.*  
 †C. L. Beals, M. S., *Asst. Chem.*  
 †E. N. Boland, M. S., *in charge Pig Club*  
*Work (Coop. U. S. D. A.).*  
 †A. I. Bourne, B. A., *Asst. Ent.*  
 †W. H. Bronson, B. S., *Ext. Instr. Farm*  
*Mgt.*

- †J. P. Buckley, Jr., *Asst. Chem.*  
 \*†A. E. Cance, Ph. D., *Agr. Econ.*  
 \*J. S. Chamberlain, Ph. D., *Org. and*  
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- \*W. W. Chenoweth, M. S., (*Assoc.*)  
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- \*†O. L. Clark, B. S., (*Asst.*) *Bot.; Asst.*  
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- \*W. D. Clark, M. F., *For.*  
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- †Laura Comstock, (*Ext.*) *Home Econ.*  
 \*Samuel Coons, *Instr. Dairying.*

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- †E. F. Damon, B. S., (*Ext. Assoc.*) *Agr.*  
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- \*†H. T. Fernald, Ph. D., *Ent.*  
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- ‡E. H. Forbush, *Supervisor Corresp.*  
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- †H. J. Franklin, Ph. D., *Cranberry Invest.*  
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- \*†G. E. Gage, Ph. D., (*Assoc.*) *An. Path.;*  
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- †E. F. Gaskill, B. S., *Asst. Agr.*  
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*Geol.*

- \*†J. C. Graham, B. S., *Poultry Husb.*  
 \*†C. R. Green, B. Agr., *Libr.*

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 \*A. K. Harrison, (*Asst.*) *Landsc. Gard.*

- \*W. R. Hart, A. M., *Agr. Ed.*  
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- †H. D. Haskins, B. S., *Chem. in charge*  
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- †E. B. Holland, Ph. D., *Assoc. Chem in*  
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- †J. T. Howard, *Collector.*  
 \*Arao Itano, Ph. D., *Instr. Microbiol.*

- \*O. A. Jamison, B. S., (*Asst.*) *Dairying*.  
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\*Earl Jones, M. S., (*Asst.*) *Agron.*  
\*†F. C. Kenney, *Treas.*  
‡A. D. Kilham, A. B., *Ext. Instr. Pomol.*  
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\*E. M. Lewis, A. M., *Dean of Coll.*  
\*†J. B. Lindsey, Ph. D., *Chem. Vice Dir. of Sta.*  
\*W. P. B. Lockwood, M. S., *Dairying*.  
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\*J. C. McNutt, B. S., *An. Husb.*  
\*†C. E. Marshall, Ph. D., *Microbiol. Dir. Grad. School.*  
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\*F. G. Merkle, B. S., *Asst. in Agron.*  
‡E. L. Morgan, A. M., (*Ext.*) *Community Planning.*  
†F. W. Morse, M. S., *Research Chem.*  
‡Ethel H. Nash, *Ext. Instr. Agr. Ed.*  
\*†A. H. Nehrling, (*Assoc.*) *Flor.*  
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 \*Ralph McBurney, B. S., *Instr. Bact.*  
 \*A. C. McCulloch, B. S., *Instr. Poultry Husb.*  
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 \*Christie Moore,<sup>1</sup> B. S., *Instr. Dom. Sci.*  
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| *A. J. Fredholm, Sc. D., <i>D. Agr., Veg. Path., Tropical Crops.</i> |  |

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| †P. L. Gile, A. B., <i>Chem.</i>                                 | †W. A. Mace, B. A., <i>Asst. in Ext. Work.</i> |
| †H. C. Henriksen, B. Agr., <i>Asst. in Ext. Work (San Juan).</i> | †R. H. Van Zwaluwenburg, B. S., <i>Ent.</i>    |

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| †H. B. Cowgill, M. S., <i>Plant Breeder.</i> | †E. G. Smyth, <i>Actg. Ent.</i>              |
| †W. C. Hanson, <i>Asst. Ent.</i>             | †J. A. Stevenson, B. S., <i>Path.</i>        |

<sup>1</sup> On leave.

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- †H. Alida Birch, *Libr.*
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- \*G. E. Spencer, B. S., *Instr. Bot.*
- ‡E. K. Thomas, *State Club Leader.*
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- \*†J. G. Hutton, M. S., (*Assoc.*) *Agron.; Assoc. Agron.*

- \*†V. R. Jones, M. S., (*Asst.*) *Dairy Husb.; Asst. Dairy Husb.*
- \*†Christian Larsen, M. S. A., *Dairy Husb.*
- †R. A. Larson, *Sec.*
- \*Louise Leaton, B. S., *Instr. Home Econ.*
- \*†C. C. Lipp, D. V. M., *Vet. Med.; Consult. Vet.*
- †Howard Loomis, B. A., *Asst. Agron.*
- †F. E. McCall, B. S., *Hort. Specialist.*
- †W. M. Mair, *Supt. Boys' and Girls' Clubs.*
- \*H. B. Mathews, M. S., *Phys.*
- †T. A. Meehan, *Dairy Specialist.*
- \*C. W. Michel, M. A., *Bot.*
- \*S. P. Miller, A. M., *Zool.*
- †G. E. Morrison, B. S., *Live Stock Specialist.*
- †J. D. Morrison, *Crop Work, Highmore Substa. (Coop. U. S. D. A.).*
- †W. A. Ostrander, M. S., *Farm Mgt.*
- †R. L. Patty, B. S., *Agr. Engin. Specialist.*
- \*N. F. Peterson, A. M., *Instr. Bot.*
- \*W. H. Powers, M. A., *Libr.*
- \*†H. E. Rilling, M. S., *Asst. Agron.*

<sup>1</sup> On leave.

- \*†H. C. Severin, M. A., *Ent. (State Ent.)*.  
 \*†J. H. Shepard, B. S., *Chem.*  
 \*†R. C. Sherwood, M. S., *Asst. Chem.*  
 \*G. A. Starring, A. B., *Agr. Editor.*  
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 \*B. L. Thompson, B. S., (*Assoc.*) *An. Husb.*  
 \*Mabel Ward, B. S., *Home Econ.*  
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 †J. E. Converse, *Asst. in Coop. Expts., Crossville.*  
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 †H. B. Potter, B. S., *Editor Ext. Pubs.*  
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 \*†O. M. Watson, (*Asst.*) *Hort.; Hort.*  
 †H. R. Watts, B. S., *Asst. Ent.*  
 †L. G. Willis, B. S., *Asst. Chem.*  
 \*†C. A. Willson, M. S. A., *An. Husb. (In charge An. Husb. and Dairying.)*  
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 \*Martha Brown, *Applied Dom. Sci.*  
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 \*M. B. Taubenhaus, *Supt. Poultry Farm.*  
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 \*C. A. Wood, M. S., (*Assoc.*) *Agron.*  
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 \*Ruth E. Cox, *Asst. in Sewing.*  
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 \*H. S. Estelle, *Asst in Agr.*  
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 \*Mrs. R. L. Ewell, *Asst in Laundry.*  
 \*Katie V. Fulton, *Asst. in Sewing.*  
 \*J. T. Hodges, *Libr.*  
 \*Miss C. G. Howard, *Asst. in Cooking.*  
 \*Mrs. Ethel L. McGee, *Cooking, Dom. Econ.*  
 \*J. V. Smith, *Asst. in Agr.*  
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<sup>1</sup> On leave.

- ‡Blanche Cooper, B. S., *Home Construction and Sanitation*.  
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 ‡B. R. Eldredge, B. S., (Asst.) *Dairying*.  
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 \*†W. E. Goodspeed, B. S., *Instr. Hort.; Asst. Hort.*  
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 †O. P. Madsen, *Asst. Poultryman.*  
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## VERMONT.

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 \*R. T. Burdick, B. S., (Asst.) *Agron., Farm Mech.*  
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 \*††W. H. Crockett, *Editor.*  
 \*††M. B. Cummings, Ph. D., *Hort. Ext. Specialist in Hort.*  
 †Annette C. Dimock, *Instr. Home Econ.*  
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 ‡L. H. Flint, B. S., *Instr. Bot.*  
 \*†Stanley Hargreaves, *Gardener.*  
 \*†A. F. Hawes, M. F., *For. (State For.).*  
 \*J. K. Hooper, *Lect. on Met.*  
 †E. L. Ingalls, A. B., *State Club Leader.*  
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## VIRGINIA.

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 Vawter, C. E., 60.  
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 Waite, R. H., 29.  
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 Walker, J. C., 65.  
 Walker, L. S., 30.  
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 Wallace, B. A., 34.  
 Wallace, R. C. E., 20.  
 Waller, A. G., 41.  
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 Waller, K. A., 65.  
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 Washington, B. T., jr., 6.  
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 Welch, P. S., 25.  
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 White, O. K., 32.  
 White, S., 61.  
 White, T. H., 29.  
 White, W. B., 45.  
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 White, Mrs. W. P., 14.  
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